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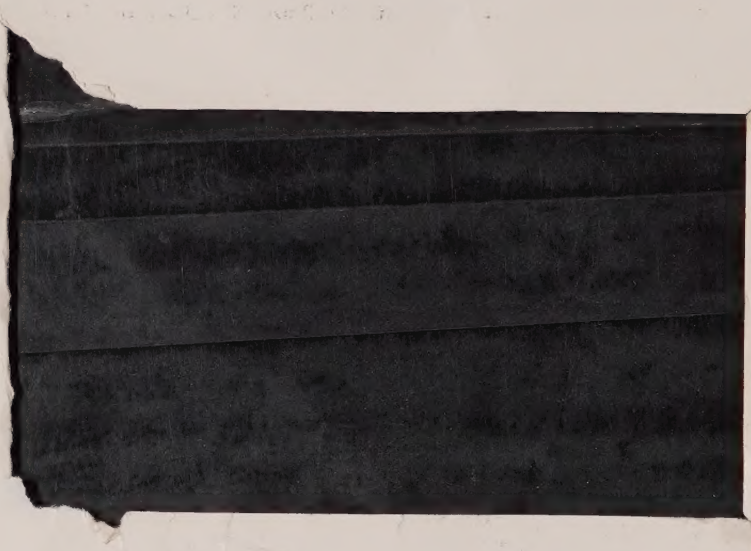
VIKING LABORATORIES INC.

MP MASTER
MA28068



CALIFORNIA INSTRUMENTS CORPORATION
San Diego, California 92110

April 1973
Fourth Printing

# INSTRUCTION MANUAL

A408

# 8303 SERIES

# DIGITAL

# OHMMETER

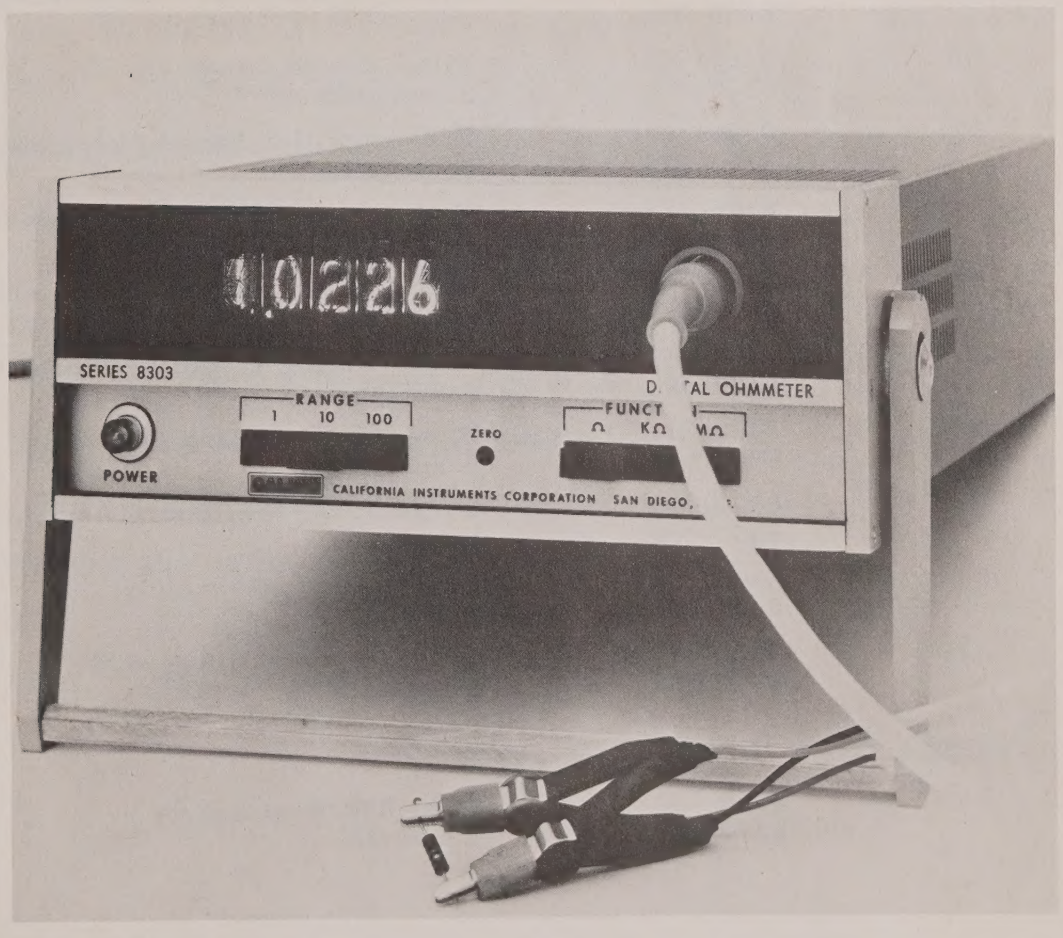



FIGURE 1.

VIKING LABORATORIES INC.

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# SPECIFICATIONS

| Range (in ohms) | 1, | 10, | 100, | 1K, | 10K, | 100K, | 1M, | 10M, | 100M |
|---|---|---|---|---|---|---|---|---|---|
| Accuracy at 25°C | | | | | | | | | |
| % of Reading | ←——— ±0.02 ———→ | | | | | | ±.03 | ±0.1 | ±1.0 |
| and % of Full Scale | ←——— ±0.01 ———→ | | | | | | ±.02 | ±0.1 | ±1.0 |
| Source Current | 100ma | 10ma | 1ma | 100μa | 100μa | 100μa | 10μa | 1μa | 100na |
| Stability/Month | ←——— .02% ———→ | | | | | | .05% | 0.1% | 1.0% |
| Temperature Coefficient/°C | | | | | | | | | |
| % of Reading | ←——— .002 ———→ | | | | | | .005 | .01 | .09 |
| and % of Full Scale | ←——— .001 ———→ | | | | | | .002 | .005 | .02 |
| Line Voltage Stability | ←——— .001%/volt ———→ | | | | | | | .002%/ volt | .005%/ volt |
| Nominal Settling Time to Accuracy | ←——— 1 sec ———→ | | | | | | | 10 sec | 100 sec |

## Common Specifications

| | | | |
|---|---|---|---|
| Resolution: | .01% of Full Scale | Maximum Safe Input: | 200VDC or peak AC |
| Linear Overrange: | 20% * | Display Time: | 200 msec nominal |
| Ambient Temperature: | 0 to 50°C | Digitizing Time: | 150 msec |
| Power: | 15 watts max. 115 ±10VAC or 230 ±20VAC, 50 to 400 Hz | Size: | 3 1/2" x 8 3/4" x 14 1/2" |
| Weight: | 8 lbs. net, 12 lbs, shipping | | |

* Overload indicator turns on for reading above 11999.

All specifications apply when tested in accordance with standard CALICO test procedures.

## GENERAL DESCRIPTION

### 1.1 INTRODUCTION

This instruction manual contains information on the installation, operation, calibration and maintenance of the CALICO 8303 Digital Ohmmeter.

### 1.2 DESCRIPTION

The CALICO Model 8303 is a Precision Digital Ohmmeter.

The ranges and functions are selected by push buttons located on the front panel.

The CALICO Model 8303 Digital Ohmmeter uses integrated circuits extensively throughout the instrument. The unit operates from 115 volts or 230 volts AC, from 50 to 400 Hz, and consumes less than 15 watts.

### 1.3 EQUIPMENT SUPPLIED

The unit is shipped with an 8303-403 Accessory Kit consisting of:

1 - Beldon #17258 Power Cord
1 - Littlefuse .1A. S.B. Fuse
1 - Walsco 2525 Alignment Tool
1 - CALICO 8303 Instruction Manual

### 1.4 ACCESSORY EQUIPMENT

| | |
|---|---|
| Option R | Rack Mount Adapter |
| Option B | Bench Mount Adapter |
| Option P | BCD Print Card |
| Option K | 4 Wire Kelvin Clip Cable |

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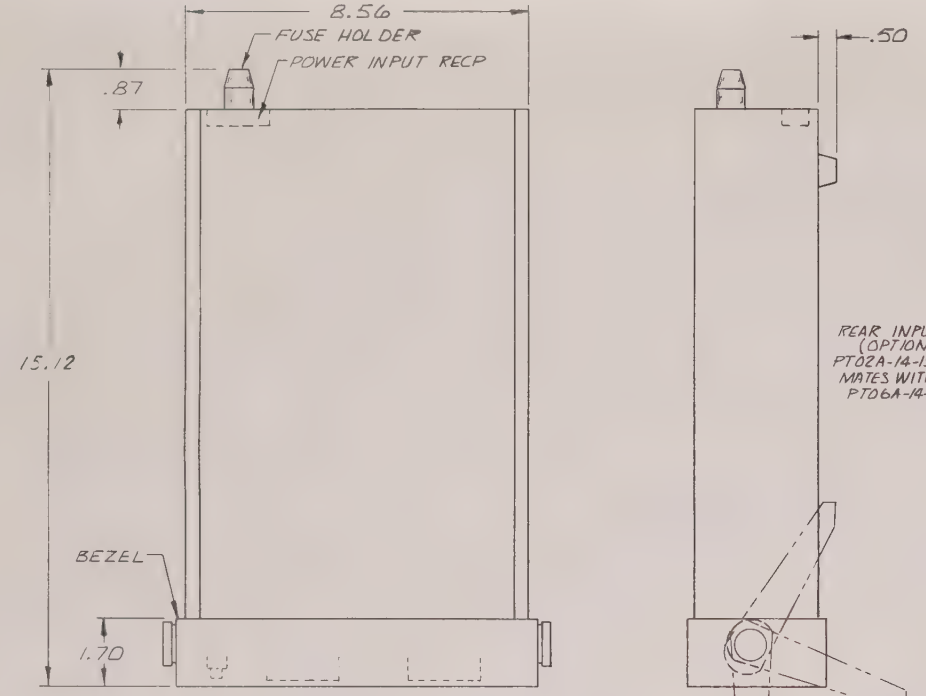
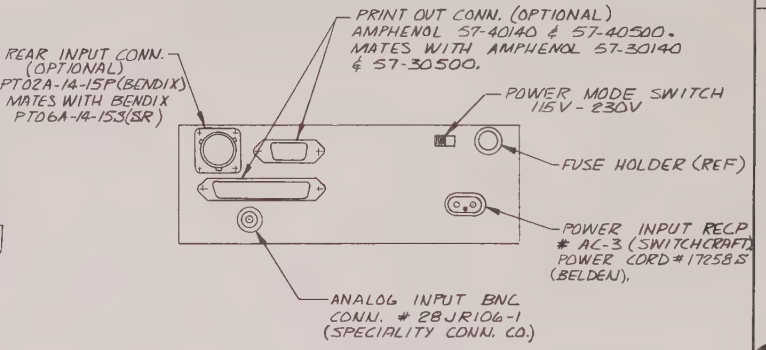



8303 SHOWN


PRINT OUT CONN. (OPTIONAL) AMPHENOL 57-40140 & 57-40500. MATES WITH AMPHENOL 57-30140 & 57-30500.
REAR INPUT CONN. (OPTIONAL) PT02A-14-15P(BENDIX) MATES WITH BENDIX PT06A-14-15S(SR)
POWER MODE SWITCH 115V - 230V
FUSE HOLDER (REF)
POWER INPUT RECP # AC-3 (SWITCHCRAFT) POWER CORD # 17258/S (BELDEN).
ANALOG INPUT BNC CONN. # 28JR106-1 (SPECIALITY CONN. CO.)

REAR PANEL

REAR INPUT CONN. WIRING

| | |
|---|---|
| PIN M | Hi INPUT |
| PIN R | CURRENT SOURCE |
| PIN N | Lo INPUT |
| PIN P | CURRENT RETURN |
| PINS A THRU K - | GUARD |

NOTES: (UNLESS OTHERWISE SPECIFIED)

REVISIONS

| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
|---|---|---|---|---|---|---|
| | | | | | | |

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

DIM IN INCHES TOLERANCES .XXX = .010 .XX = .03 X° = 30'

BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓

DWG SIZE C

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TITLE: OUTLINE DRAWING, OHMMETER

MODEL 8303

| | | | |
|---|---|---|---|
| RELEASE | E Fuglitz 10/9 | | |
| CHECKER | | PURCHASING | |
| DESIGN | | PROJ ENGR | |
| DRFTSMN | MARTIN 10-30-69 | CHF ENGR | |

| DASH NO. | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO.

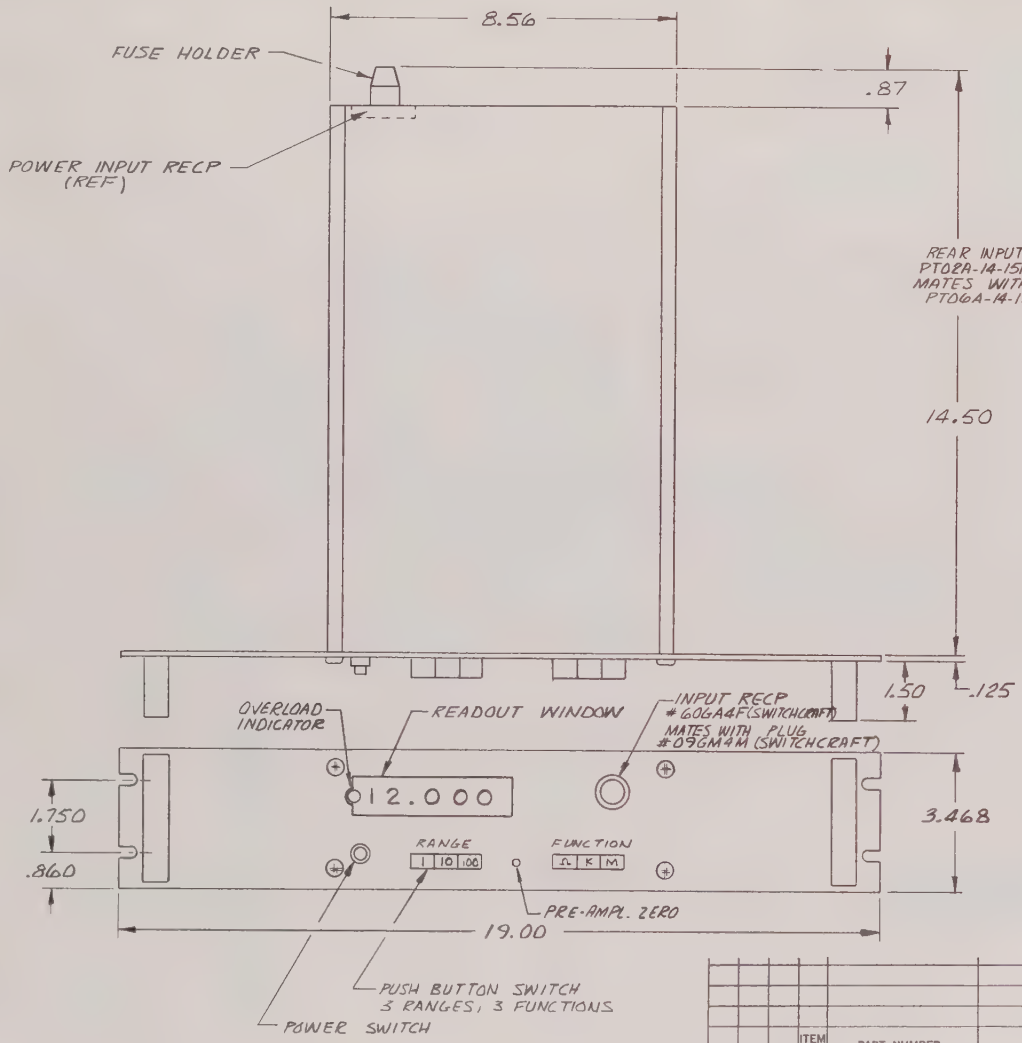
CODE IDENT 16067

DWG NO. C8300-902 REV -

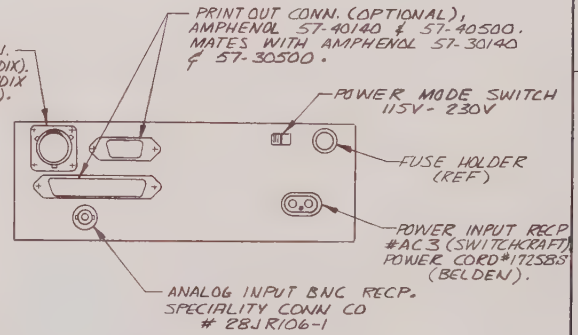
SCALE 1:2 SHEET 1 OF 1

CALICO F-102

C8300-902




8303 R SHOWN


REAR INPUT CONN. PT02A-14-15P (BENDIX). MATES WITH BENDIX PT06A-14-15S(SR).
PRINT OUT CONN. (OPTIONAL), AMPHENOL 57-40140 & 57-40500. MATES WITH AMPHENOL 57-30140 & 57-30500.
POWER MODE SWITCH 115V - 230V
FUSE HOLDER (REF)
POWER INPUT RECP #AC3 (SWITCHCRAFT) POWER CORD #17258S (BELDEN).
ANALOG INPUT BNC RECP. SPECIALITY CONN CO # 28JR106-1

## REAR PANEL

REAR INPUT CONN. WIRING

PIN M Hi INPUT
PIN R CURRENT SOURCE
PIN N Lo INPUT
PIN P CURRENT RETURN
PINS A THRU K - GUARD

NOTES: (UNLESS OTHERWISE SPECIFIED)

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |

| ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|

REQD PER ASSY

DIM IN INCHES TOLERANCES .XXX = .010 .XX = .03 X° = 30'
BREAK ALL SHARP CORNERS & EDGES MACH SURFACES
DWG SIZE C

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DASH NO. | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH

TITLE: OUTLINE DRAWING, OHMMETER, RACK MOUNT

MODEL 8303R

| | | | |
|---|---|---|---|
| RELEASE | E Ellis | 10/9/69 | |
| CHECKER | | | PURCHASING |
| DESIGN | | | PROJ ENGR |
| DRFTSMN | Martin | 10-30-69 | CHF ENGR |

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CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

CONTRACT NO. | CODE IDENT 16067

DWG NO. C8300-903 | REV -

SCALE 1:2 | SHEET 1 OF 1

C8300-903 -

CALICO F-102

## INSTALLATION AND OPERATION

### 2.1 UNPACKING

This Ohmmeter is shipped in a cardboard container with a protective inner packing. Do not destroy the packing container until the unit has been inspected for possible damage in shipment.

### 2.2 POWER REQUIREMENTS

The unit operates from 115 VAC ±10 VAC or 230 VAC ±20 VAC at 50 to 400 Hz. The power consumption is less than 15 watts.

### 2.3 OPERATING CONTROLS

#### 2.3.1 FRONT PANEL CONTROLS

##### 2.3.1.1 RANGE SWITCH

The range switch is a three station, interlock, push button switch located on the left side of the front panel. The three ranges are 1, 10 and 100. These ranges are direct multipliers for the units of measure used on the function switch, i.e., 10Ω, 10KΩ, etc.

##### 2.3.1.2 FUNCTION SWITCH

The function switch is a three station, interlock,push button switch located on the right side of the front panel. These functions are Ω, KΩ and MΩ.

##### 2.3.1.3 FRONT PANEL ZERO CONTROL

The front panel zero control is used to zero the pre-amplifier. It, therefore, has the most effect when the preamplifier is used at its highest gain setting. The highest preamplifier gain setting is used on all Ω's ranges and the 1 KΩ range.

##### 2.3.1.4 POWER SWITCH

The front panel power switch is a lighted push button type switch. It is a push for on -- push for off type action.

#### 2.3.2 REAR PANEL CONTROLS

##### 2.3.2.1 115-230 SWITCH

The rear panel 115-230 switch allows the 8303 to be operated from 115 volts AC or 230 volts AC. To operate from 115 volts AC, slide the switch to the 115V position and install a .2 amp slow blow fuse. To operate from 230 volts AC, slide the switch to 230V and install a .1 amp slow blow fuse.

## 2.4 ACCEPTANCE TEST PROCEDURE

Inspect the unit for any possible shipping damage immediately upon receipt. If any damage is evident, notify the carrier. Do not return the instrument to the factory without prior approval. If the unit appears to be in good condition, perform the following:

a) Connect a wattmeter between the AC power input to the digital ohmmeter and the AC line. Check that the 115-230 switch is in the desired position and the proper fuse is installed. Turn the unit on and check that the power does not exceed 15 watts. Allow 15 minutes for the digital ohmmeter to warm up.

b) Short all three input leads together. Select the KΩ function and the 100 range. Check that the display reads 00.000 ±1 digit.

c) Connect the 8303 input to a 100 KΩ .005% precision resistor. The 8303 should read 100.00 ±2 digits.

d) If further evaluation is required, see Section 4.2., Calibration Procedure.

## 2.5 INSTALLATION

The CALICO Model 8303 Digital Ohmmeter may be bench mounted or rack mounted. To rack mount, specify Option R Rack Mount Adapter. To bench mount, specify Option B Bench Mount Adapter.

Although no special cooling fans are required, the unit should be installed so that the flow of air is not obstructed. Care should also be taken not to install the unit in areas where excessive heat is produced by other equipment.

## THEORY OF OPERATION

### 3.1 GENERAL

The CALICO Model 8303 Digital Ohmmeter uses a single ramp type digital voltmeter for the analog to digital converter. A block diagram which illustrates the theory of operation, is shown in Figure 2. A precision constant current source is connected to the voltmeter input. This precision current causes a voltage drop across the unknown resistance. This signal is applied to a solid state chopper stabilized preamplifier with gains of +1.0, +10.0, and +100.0. This provides a full scale input to the analog to digital converter of ±10 volts on all input ranges.

The voltage ramp is reset to approximately +15 volts at the start of each conversion sequence as shown in Figure 3. The negative slope of this precision ramp is determined by stable passive components and the semi-infinite gain of an operational integrator.

This precision voltage ramp drives the inverting inputs of two differential comparators. The non-inverting input to one comparator is driven by the unkown input signal through the input amplifier. The non-inverting input of the remaining comparator is grounded. Figure 3 illustrates the timing sequence for a -10 volt input signal.

The output of these comparators drive a dual exclusive or gate which generates a pulse-width modulated signal. The width of this pulse-width modulated signal is proportional to the amplitude of the input signal.

This pulse-width modulated signal is used to gate a crystal controlled clock. The resulting pulse train is fed into a digital counter to produce a numerical representation equivalent to the analog input. This number is transferred into a digital storage register upon receipt of a load register pulse. The output of this register drives a set of decoder drivers which in turn drive a set of nixie tubes.

The time base generator is used to determine the timing sequence throughout the digital multimeter.

### 3.2 DETAILED CIRCUIT DESCRIPTION

#### 3.2.1 TIME BASE GENERATOR

The time base generator consists of a uni-junction transistor oscillator and associate wave shaping circuits located on the A2 assembly. A schematic diagram for this circuitry is shown on drawing E8300-071 and consists of transistor A2Q3, integrated circuit A2IC4 and associated components.

The uni-junction oscillator generates a non-symmetrical output which is used to divide the machine timing into two intervals, a restore time period and an encode time period. The charging time of the uni-junction oscillator, which determines the encode time period of the machine, is set by A2R18 and A2C5 and is approximately 200 milliseconds. The discharge time of the uni-junction oscillator, which determines the restore time period of the machine is set by A2R22 and A2C5 and is approximately 15 milliseconds.

The output of the uni-junction oscillator is applied to A2IC4 and Pin 12 where it is converted to a rectangular pulse by two successive invertors. The positive going, or leading edge, of this pulse is used to reset the ramp to approximately +15 volts. This signal is available at A2IC4 Pin 1 and is illustrated in Figure 3, waveform G. The load storage register signal is generated at A2IC4 Pin 2 and is illustrated in Figure 3, waveform I.

The decade counter reset pulse is generated at A2IC22 Pin 3 and is illustrated in Figure 3, waveform J. This pulse is approximately 0.1 microsecond behind the positive going edge of the load register pulse. The decade counter reset pulse is approximately 1 millisecond wide and is used to reset the decade counters back to zero.

### 3.2.2 INPUT AMPLIFIER

The input amplifier is a chopper stabilized potentiometric amplifier. A schematic diagram for this amplifier is located on drawing D8300-073. This amplifier is the A10 assembly.

This amplifier is divided into five sections; the modulator, the carrier amplifier, the demodulator, the output integrator and the oscillator driver.

The oscillator, A10IC2 and associated components, operates at a normal frequency of 525 Hz. This oscillator is a Wein Bridge type oscillator. The amplitude control is provided by means of two zener diodes A10CR9 and A10CR10. The output A10IC2 Pin 6 drives two drivers; the modulator driver A10Q3 and the demodulator driver A10Q5. The modulator driver produces a trapezoidal waveform swinging between 0 volts and +5.5 volts. The demodulator driver produces a square wave that swings between 0 volts and +8 volts.

The modulator A10Q2 is a MOSFET connected as a common source switch. The DC gate bias is derived from the same feedback point that the case and source are driven from. The gate drive signal is applied through A10C4. Any voltage difference between the feedback and the input will appear as a 525 Hz square wave at the drain lead of A10Q2.

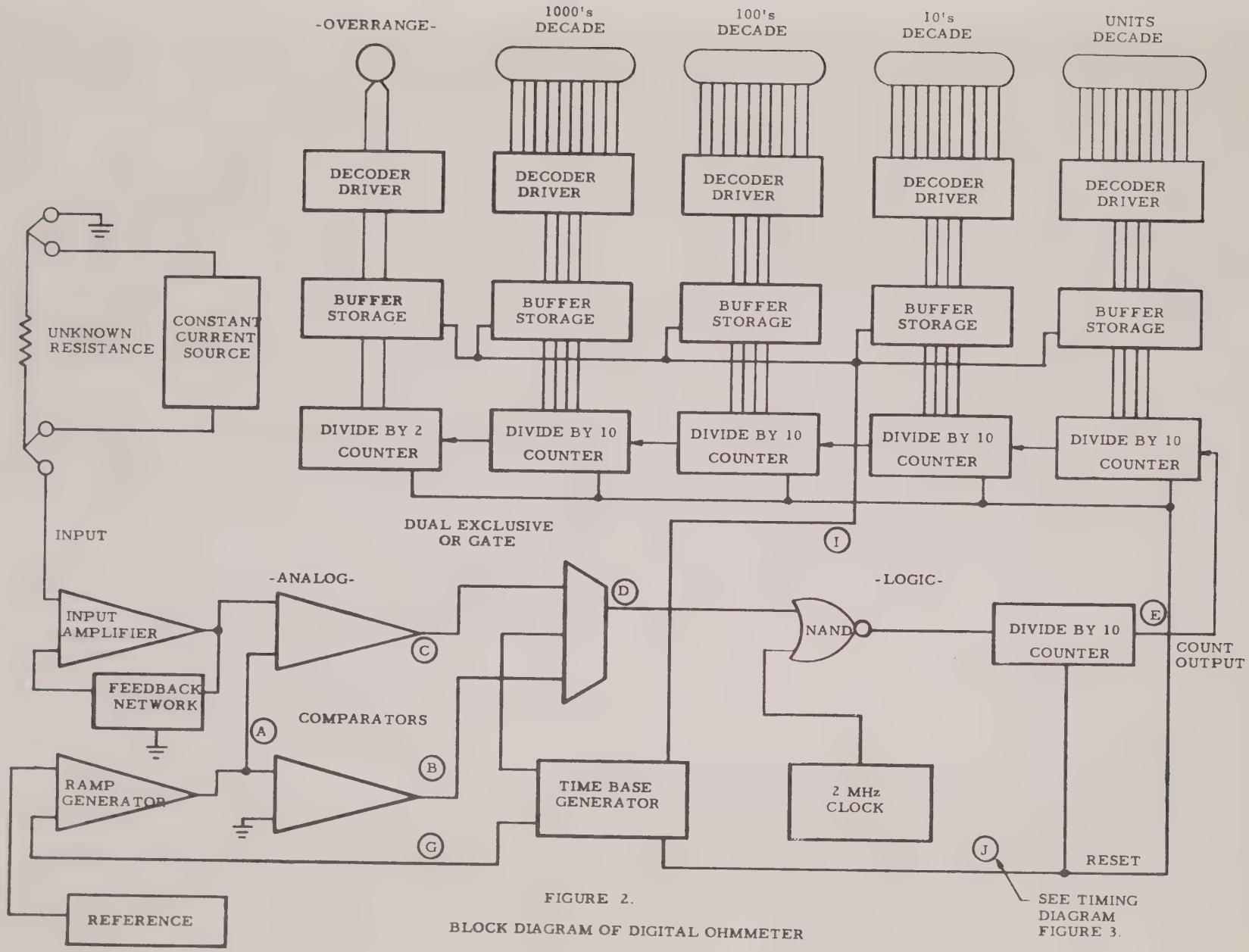



FIGURE 2.

BLOCK DIAGRAM OF DIGITAL OHMMETER

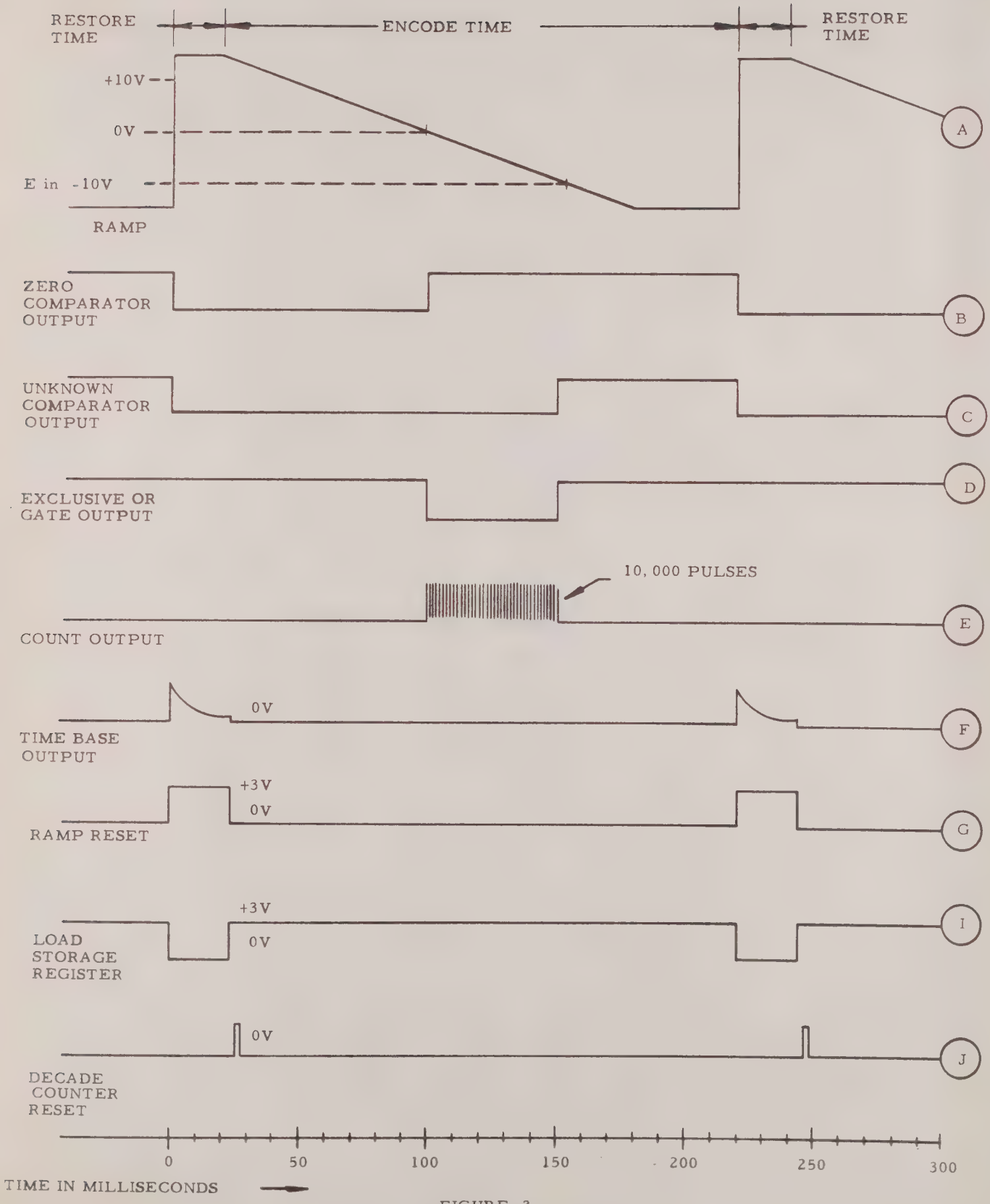



FIGURE 3.

INTERNAL WAVEFORMS
(REF. TO FIGURE 2)

This modulated signal is then fed into the carrier amplifier through A10C2. The carrier amplifier A10Q1 and A10IC1 is an AC coupled, non-innerting amplifier with a gain of approximately 1000 at 525 Hz.

The output of the carrier amplifier A10TP2 is applied to the demodulator through A10R15. The demodulator A10Q6 receives its base drive through A10CR5, A10CR6, A10CR7 and A10CR8 from the demodulator driver A10Q5.

The output of the demodulator drives the output integrator A10IC3 through A10R19. The output of the output integrator A10 Pin 10 is returned to one of three feedback loops A10 Pin 3, A10 Pin 4 or A10 Pin 5 by way of the push button switches on the master board A1. If the output A10 Pin 10 is connected to feedback point A10 Pin 3, 100 per cent of the output is returned as feedback giving a gain of +1.00. If the output A10 Pin 10 is connected to feedback point A10 Pin 4, 10 per cent of the output is returned as feedback giving a gain of +10.0. If the output A10 Pin 10 is connected to feedback point A10 Pin 5, 1 per cent of the output is returned as feedback giving a gain of +100.0.

The zeroing of the amplifier is accomplished by feeding a DC voltage into A10 Pin 1 from a front panel zero adjustment.

### 3.2.3 INPUT FILTER

The input filter A8 is a 5 pole active, notch/RC type. A schematic diagram is contained on drawing C8300-075.

The notch filter is formed by A8R2, A8R3, A8R5, A8R6, A8C1, A8C2 and A8C3. The RC section is formed by A8R1, A8R4 and A10C1. The input is applied at A8 Pin 4. Low frequency signals, DC to 50 Hz, are fed directly through to the output A8 Pin 5. Signals present at the output are applied to the input of the direct coupled amplifier A8Q1 gate. These signals are fed through the amplifier at a gain of .995 and reinjected into the notch through A8R6. As the input signal reaches 60 Hz, the phase shift in the notch is 180° thus causing the feedback to be out of phase with the input. This gives high rejection to frequencies around 60 Hz. Because the same DC voltage is present on both sides of the capacitors, no net change is produced thus eliminating the source impedance dependency of conventional notch filters. As the frequency is increased A8C1 and A8C3 become a low impedance by-pass for A8R2 and A8R3, thus leaving A8R1, A8R4 and A10C1 to form a simple RC section. This section starts to roll off around 30 Hz but does not become effective until it reaches 100 Hz. Overvoltage protection is provided by two low leakage diodes, A8CR1 and A8CR2, reverse biased to the power supplies.

### 3.2.4 RAMP GENERATOR

The ramp generator is located on the A2 assembly and a schematic diagram is shown in drawing E8300-071. This ramp generator consists of A2Q2, A2IC1 and associated components.

The ramp generator is an operational integrator which converts a precision input current into a linear voltage ramp. Transistor A2Q2 is a dual transistor used in the differential emitter follower configuration to provide a high input impedance at the summing point of the operational integrator. The output of this differential emitter follower is used to drive a high gain integrated circuit amplifier A2IC1. The output of A2IC1 is returned to the inverting input of A2Q2 through a precision integrating capacitor.

The precision input current to the ramp generator is determined by a zener diode reference and a series resistance to the summing point. The zener diode reference consists of A2Q1, A2CR1 and associated components. Transistor A2Q1 is used as a constant source of current which drives the zener reference A2CR1. The temperature coefficient of this zener reference is matched to the temperature coefficient of the precision integrating capacitor A2C1. This is accomplished by adjusting the value of resistor A2R6.

### 3.2.5 COMPARATORS

The comparators are located on the A2 assembly and a schematic diagram is shown in drawing E8300-071. The comparators A2IC3 and A2IC2 are high gain differential amplifiers. The inverting input to each comparator is driven from the ramp output through A2R15 and A2R16. The non-inverting input to A2IC3 is grounded through A2R3 and A2R19. The non-inverting input to A2IC3 is driven by the unknown input through A2R17 and A2R14 from the output of the input amplifier. Diodes A2CR6, A2CR7, A2CR8 and A2CR9 form input protection networks for the comparators.

As the ramp output becomes more negative than the non-inverting input of either comparator, this comparator output drives positive. The difference in time when one comparator output is driven positive and when the other comparator is driven positive is directly proportional to the analog input voltage.

Each comparator output drives an invertor located on the A2 assembly. These invertors A2IC5 are used to inhibit the comparator output during the ramp restore time interval.

### 3.2.6 DUAL EXCLUSIVE OR GATE

The dual exclusive or gate is located on the A2 assembly and a schematic diagram is shown in drawing E8300-071. This gate is driven from the invertors contained in integrated circuit A2IC5.

The dual exclusive or gate A2IC7 is comprised of four dual input nor gates. The purpose of this gate is to give an output only when a difference exists between comparator outputs. The block diagram and truth table per Figure 4 illustrate how this is accomplished.

### 3.2.7 2 MHz CRYSTAL OSCILLATOR

The 2 MHz crystal oscillator is located on the A2 assembly and a schematic diagram is shown in drawing E8300-071.

The function of the crystal oscillator is to provide a precision frequency which is used to accurately measure the pulse width of the dual exclusive or gate output.

The 2 MHz crystal oscillator consists of A2IC6, crystal A2Y1 and associated components. Resistors A2R27 and A2R28 provide a DC bias current to the two stage integrated circuit oscillator. The crystal is placed in the positive feedback loop of the oscillator.

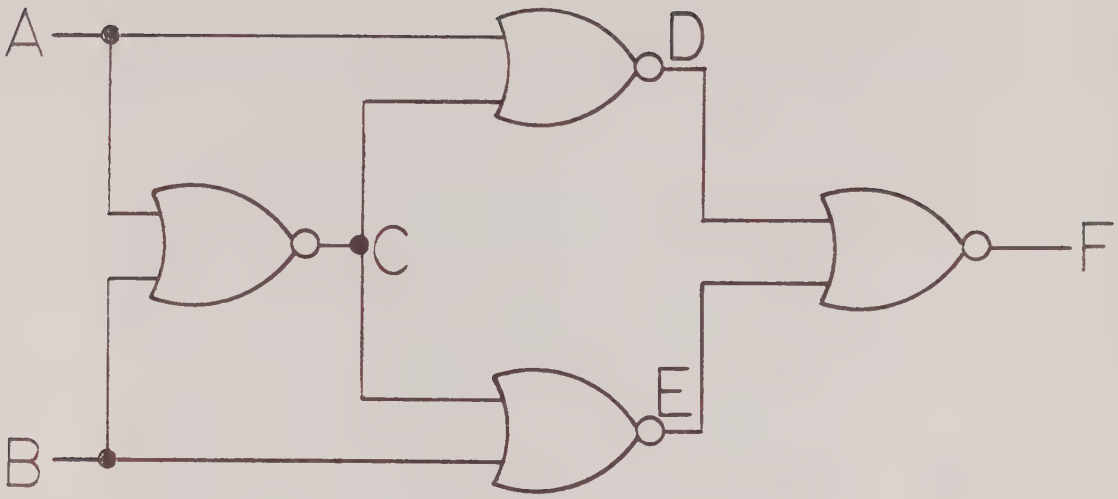
The output of the 2 MHz oscillator is gated with the output of the dual exclusive or gate and provides a 2 MHz pulse train at Pin 5 of A2IC4.

This 2 MHz pulse train drives a divide by ten integrated circuit counter A2IC11. The resulting 200 KHz pulse train output, at Pin 8 of A2IC11, is used to drive the decade counters.

### 3.2.8 DECADE COUNTER

Each decade contains an integrated circuit counter, storage register, decoder-driver and nixie display tube. A schematic diagram for the decade counter is shown in drawing E8300-071.

The 200 KHz pulse train is applied to the decade counter A2IC10 in the "units" decade. The count output of the "units" decade is used to drive the count input of the "tens" decade. In like manner, the output of the "tens" decade is used to drive the "hundreds" decade, etc. The total count is accumulated in all the decade counters before the end of the encode time as shown in Figure 3 waveform E.




TRUTH TABLE

POSITIVE "1" STATE

| A | B | C | D | E | F |
|---|---|---|---|---|---|
| 0 | 0 | 1 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 1 |

THE OUTPUT AT "F" IS TRUE ONLY WHEN A DIFFERENCE EXISTS BETWEEN POINTS "A" AND "B".

FIGURE 4.

TRUTH TABLE

At the start of the restore time, when the load storage register pulse goes to zero volts, the BCD number in each of the decade counters is transferred into the storage register A2IC9, A2IC13, etc.

The BCD outputs of each of the storage registers activate the corresponding decoder-drivers A2IC8, A2IC12, etc. The ten-line output of the decoder-drivers activates the nixie tubes DS-1, DS-2, etc.

At the conclusion of the restore time period, all decade counters are reset to zero and are ready to receive new data.

### 3.2.9 OVERRANGE

The overrange circuitry is located on the A2 assembly and a schematic diagram is shown in drawing E8300-071.

The overrange circuitry has two modes of operation. These are:

1) In the first mode, no count pulses are received from the last decade counter stage, and as a result, a zero occurs in the overrange indicator.

2) In the second mode, a single count pulse is received from the last decade counter, and as a result, a "1" indication occurs in the overrange indicator.

The operation of the overrange circuit can be explained as follows:

The count output of the last decade is applied to the input of an invertor A2IC22 Pin 14. This invertor output A2IC22 Pin 5 is applied to the clocked input of a JK flip-flop, A3IC21 Pin 6. During the preceeding "restore" portion of the time base, the reset input A2IC21 Pin 10 was driven positive thus forcing the output A2IC21 Pin 9 on to its low state. Since the steering inputs A2IC21 Pin 5 and 7 are unbiased, the next negative pulse at the clocked input A2IC21 Pin 6 will advance the output A21C21 Pin 9 to the high state.

Both outputs of this flip-flop A2IC21 Pins 8 and 9 are used to drive the steering inputs to the next flip-flop A21C21 Pins 1 and 3. At the conclusion of the "encode" portion of the time base, a load storage register pulse occurs. This pulse is applied to the clocked input A2IC21 Pin 2. Therefore, the second flip-flop stores the data gathered in the first flip-flop. The outputs of the second flip-flop A2IC21 Pins 13 and 14 are applied to the inputs of the two nixie drivers A2Q4 and A2Q5, which in turn drive the 0 and 1 indication of the ten thousands display A2DS5.

### 3.2.10 OVERLOAD INDICATOR

The overload indicator and associated circuitry are located on the A19 assembly and a schematic diagram is shown in drawing C8300-088.

The purpose of the overload indicator is to provide a visual indication when the linear input range has been exceeded. The overload indicator has two modes of operation. The first mode occurs on functions with a linear full scale of 11999. The second mode occurs on functions with a linear full scale of 19999.

In the first mode of operation, the overload indicator turns ON when the display reaches or exceeds 12000. This is done by gating the 10,000's "1" with the 1,000's "2", "4" and "8". The 10,000's "1" is fed into A19 Pin 10 where it drives the input of a nor gate A19IC1 Pin 1 used as an inverter. This output A19IC1 Pin 3 is applied to a second nor gate A19IC1 Pin 12 used as an inverter. Therefore, a "1" at A19 Pin 10 releases the output at A19IC1 Pin 14 to go positive if the output at A19IC1 Pin 8 is released.

The 1,000's "2", "4" and "8" are applied to the or gate formed by A19CR1, A19CR2, A19CR3 and A19Q1. The output of the or gate is fed through A19R1 to the input of a nor gate A19IC1 Pin 7 used as an inverter. The output of this nor gate A19IC1 Pin 5 is fed to an input of a second nor gate A19IC1 Pin 10.

Therefore, if the 10,000's display shows a 1 or higher and the 1,000's display shows a 2 or higher, the outputs that drive A19R6 will go positive providing base drive to A19Q2 turning the overload indicator A19DS1 on.

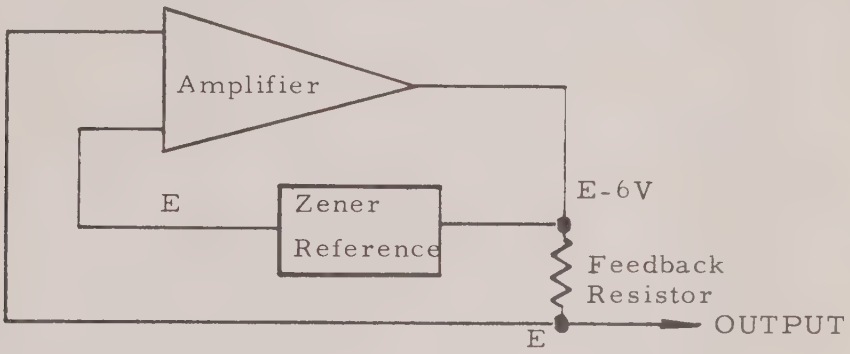
In the second mode of operation, the overload indicator turns on when the display exceeds 19999. To produce the second mode, the first mode must be disabled. This is done by applying +3.6V at A19 Pin 9 locking the output at A19IC1 Pin 8 in the "0" state. The second mode is produced when the 10,000's "1" is turned on and back off during a count sequence. The 10,000's output is applied at A19 Pin 2. This goes through an inverter and is applied at the input of a flip flop A19IC3 Pin 6.

If A19 Pin 2 is turned on and back off before a reset pulse appears at A19 Pin 11, the output of the flip flop will advance to the "1" state. If this flip flop is in the "1" state when the load register pulse appears at A19 Pin 1, the second flip flop will set to the "1" state. This "1" state output is fed through an inverter A19IC2 Pin 7 and into the base resistor A19R7 which turns the overload indicator on.

## 3.2.11 PRECISION CONSTANT CURRENT SOURCE

The precision constant current source is contained on the A17 assembly. A schematic diagram is contained on drawing number D8300-086.

The precision constant current source consists of a high gain direct coupled amplifier, a precision zener reference and a selectable feedback network.




CONSTANT CURRENT SOURCE -- Block Diagram

The direct coupled amplifier consists of a differential emitter follower pair, A17Q1, a high gain differential integrated circuit amplifier A17IC1 and an emitter follower A17Q4 driving a common emitter output stage A17Q5.

The amplifier output is applied to a floating precision reference supply. This precision reference supply is formed by driving a temperature compensated zener diode, A17CR16, from a transistor constant current source A17Q6. The nominal 6.3 volts DC provided by the precision zener is reduced by a resistive divider to produce 6.000 volts DC at the arm of A17R23.

This 6.000 volt reference voltage is then applied to the inverting input of the direct coupled amplifier. By connecting the non-inverting input of this amplifier, A17 Pin 10, back to the output of the amplifier through a precision resistor, a precision output current is produced. The current that flows in the output is the reference voltage divided by the feedback resistance.

### 3.2.12 POWER SUPPLY

The power supply is divided into five sections; the A11 assembly, the A12 assembly, the A13 assembly, the A16 assembly and the power transformer.

The A11 assembly provides ±15 volts DC. A schematic diagram is contained on drawing D8300-083. The unregulated ±24 volts enters the A11 board at Pins 5 and 1. This unregulated voltage originates on the A13 board at Pins 9 and 14. Because the two regulating sections on the A11 board are the same, the explanation will cover only the +15 volt regulator. The incoming +24 volt unregulated supply drives an integrated circuit amplifier A11IC1 Pin 7, a constant current source A11Q1, A11R1 and A11CR2, and an output driver A11Q3. The constant current source A11Q1 provides 4 MA to drive the two reference zener diodes A11CR7 and A11CR8. This provides +12 volts at Pin 3 of A11IC1. The regulated output at A11 Pin 4 is fed back to the inverting input of A11IC1 at Pin 2 through A11R11.

The resistive divider formed by A11R11 and A11R12 provides +12 volts at A11IC1 Pin 2 when the output is at +15. As the output load is increased, the output voltage becomes less positive causing A11IC1 Pin 2 to become more negative than Pin 3. This, in turn, causes the output of A11IC1 Pin 6 to drive more positive. As A11IC1 Pin 6 drives more positive, this increases the base drive to the output driver A11Q3 forcing its emitter more positive and restoring the output voltage. When the output load exceeds 180 MA, the excess base drive is pulled off the output driver through A11CR11 and A11CR13 limiting the maximum output current. This forms the short circuit protection for the regulator.

NOTE

If a short circuit is applied for more than 30 seconds, permanent damage may occur.

The A12 board provides +3.6 volts regulated output and +6.2 volts unregulated. A schematic diagram is contained on drawing C8300-082.

The A12 assembly contains a full wave silicon diode bridge rectifier A12CR1 through A12CR4, capacitive filter A12C1 and A12C2, and a high gain feedback type regulator. The power transformer A18T1 secondary 4 connects to the A12 board at Pins 1 and 3. From this the full wave silicon diode bridge and the capacitive filter provide +6.2 volts at A12 Pin 8. The integrated circuit amplifier A12IC1 operates off of +15, A12 Pin 5 and -15 volts A12 Pin 4. The output

A12 Pin 7 is fed back to the input of the amplifier A12IC1 Pin 2 through a resistive divider to the -15 volt supply. This produces 0 volts at the input when the output is +3.6 volts. If the output A12 Pin 7 becomes less positive, the input A12IC1 Pin 2 goes negative with respect to Pin 3. This drives the amplifier output A12IC1 Pin 6 more positive. In turn, The emitter of the pre-driver A12Q1 drives more positive, forcing the emitter of the output driver A12Q2 more positive, restoring the output voltage.

The A13 board contains 3 full wave silicon diode bridges and 4 output filters. A schematic diagram is contained on drawing C8300-081.

Transformer secondary A18T1-S1 connects to A13 Pins 6 and 7 and through a full wave silicon diode bridge, A13CR1 through A13CR4, to produce unfiltered +200 volts.

Transformer secondary A18T1-S2 is a center tapped winding that drives A13 Pins 10 and 11. The center tap ties to ground at A13 Pin 13. The full wave silicon diode bridge A13CR5 through A13CR8 provides ±24 volts into two filter capacitors A13C2 and A13C3.

Transformer secondary A18T1-S3 is connected to A13 Pins 3 and 4. The full wave silicon diode bridge A13CR9 through A13CR12 provides -22 volts into a capacitive output filter A13C4.

The A16 board contains a full wave silicon diode bridge and two capacitive output filters. A schematic diagram is contained on drawing B8300-087.

Transformer secondary A18T1-S5 is connected to A16 Pins 5 and 6. The full wave silicon diode bridge, A16CR1 through A16CR4, provides +30 and -33 volts into output filters A16C1 and A16C2.

## POWER SUPPLY

| Voltage | Tolerance | P-P Ripple | Ripple Freq | Voltage Available At: | Average Load Current |
|---|---|---|---|---|---|
| +15 | ±10% | 8MV | 5Hz ① | A11 Pin 4 | 62MA |
| -15 | ±10% | 2MV | 5Hz ① | A11 Pin 2 | 46MA |
| +24 | ±20% | 1V | 120Hz ② | A11 Pin 5 | 78MA |
| -24 | ±20% | .7V | 120Hz ② | A11 Pin 1 | 52MA |
| +6.2 | ±20% | .4V | 120Hz ② | A12 Pin 8 | 750MA |
| +3.6 | ±10% | 2MV | 5Hz ① | A12 Pin 7 | 700MA |
| +200 | ±20% | 1V | 120Hz ② | A13 Pin 8 | 12MA |
| -22 | ±20% | 2V | 120Hz ② | A13 Pin 5 | 10MA |
| +32 ③ | ±20% | .2V | 5 Hz ① | A16 Pin 4 | 12MA |
| -30 ③ | ±20% | 1V | 120Hz ② | A16 Pin 1 | 120MA |

All voltages and ripples are measured with 115 volts AC 60 Hz applied to the transformer primary.

① Ripple generated by 5 Hz conversion rate.

② Twice the line frequency.

③ Measured on 1Ω range with input shorted.

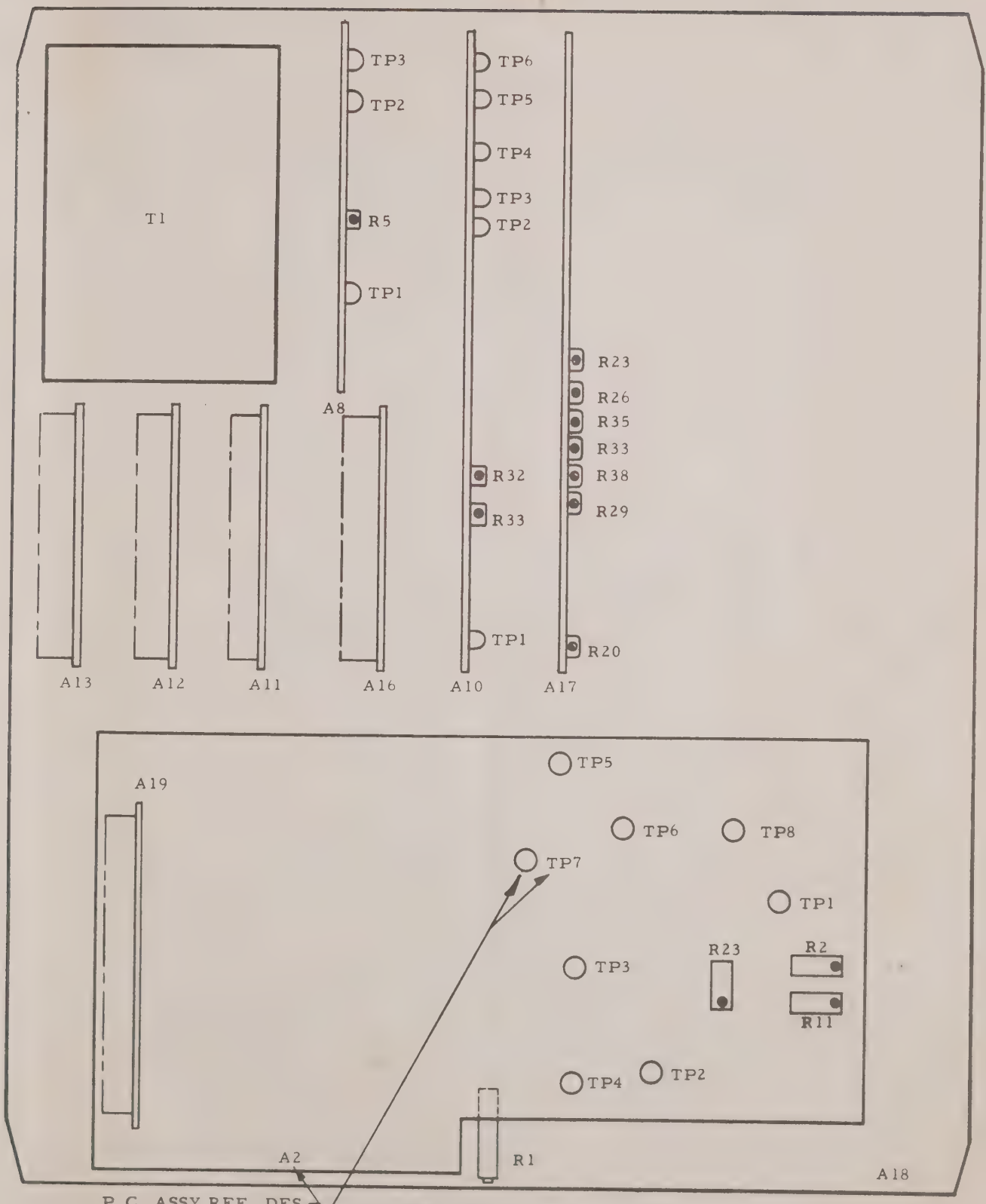



FIGURE 5. (TOP VIEW)
ADJUSTMENTS AND TEST POINTS

## CALIBRATION PROCEDURE

### 4.1 TEST EQUIPMENT REQUIRED

a) Precision resistance standards

1. 1.0 ohms ±.005%
2. 10 ohms ±.005%
3. 100 ohms ±.005%
4. 1.0 kilohms ±.005%
5. 10 kilohms ±.005%
6. 100 kilohms ±.005%
7. 1.0 mehohm ±.005%
8. 10 megohms ±.01%
9. 100 megohms ±0.1%

b) AC Wattmeter: Triplett 661 or equivalent

c) Variac: Superior Electric 216 or equivalent

d) DC Voltage Standard: Kintel 331 or equivalent.

### 4.2 CALIBRATION PROCEDURE

The following calibration procedure may be performed on a routine basis to insure that the unit remains within the specified tolerances. This procedure should always be performed after any repairs are made on the basic accuracy determining circuitry. Before calibrating the unit, apply AC power and allow a minimum of one hour to permit the internal circuitry to stabilize.

This procedure covers the following adjustments:

a) Zero adjustment of A-D Converter

b) Zero adjustment of input amplifier

c) Calibration of A-D Converter

d) Calibration of input amplifier

e) Calibration of constant current sources

f) Input filter adjustment.

The calibration procedure should be performed as follows:

4.2.1 Select the KΩ function and the 100 range. Short the input leads together. Adjust A2R23 to give 000.00 in the display.

4.2.2 Select the KΩ function and the 1 range. Short the input leads together. Adjust the front panel zero control A18R1 to produce 0.0000.

4.2.3 Select the KΩ function and the 100 range. Remove the 0.2A signal fuse A18F2 located on the master board. Connect the 8303 input leads to the output of a precision DC voltage standard. Apply an input of +10.000 volts DC ±.003%. Adjust A2R2 until the display reads 100.00. Apply an input of -10.000 volts DC ±.003%. Adjust A2R11 until the display reads 100.00.

4.2.4 Replace the 0.2A signal fuse A18F2 on the master board. Connect the 8303 input leads to a 100KΩ precision resistance standard. Record the reading.

4.2.5 Select the 10 range. Connect the 8303 input leads to a 10 KΩ precision resistance standard. Adjust A10R32 until the display reads the same number obtained in Step 4.2.4.

4.2.6 Select the 1 range. Connect the 8303 input leads to a 1KΩ precision resistance standard. Adjust A10R33 until the display reads the same number obtained in Step 4.2.4.

4.2.7 Select the Ω function and the 1 range. Connect the input to a 1.0Ω precision resistance standard. Adjust A17R23 until the display reads 1.0000Ω.

4.2.8 Select the 10 range. Connect the input to a 10Ω precision resistance standard. Adjust A17R20 until the display reads 10.000.

4.2.9 Select the 100 range. Connect the input to a 100Ω precision resistance standard. Adjust A17R29 until the display reads 100.00.

4.2.10 Select the 1 range and the KΩ function. Connect the input to a 1.0KΩ precision resistance standard. Adjust A17R26 until the display reads 1.0000.

4.2.11 Select the 100 range. Connect the input to a 100KΩ precision resistance standard. Adjust A2R2 until the display reads 100.00.

4.2.12 Select the 1 range. Connect the input to a 1KΩ precision resistance standard. Adjust A10R33 until the display reads 1.0000.

NOTE

Steps 4.2.11 and 4.2.12 interact. It may be necessary to repeat these steps more than once.

4.2.13 Select the 10 range. Connect the input to a 10KΩ precision resistance standard. Adjust A10R32 until the display reads 10.000.

4.2.14 Select the MΩ function and the 1 range. Connect the input leads to a 1MΩ precision resistance standard. Adjust A17R38 until the display reads 1.0000.

4.2.15 Select the 10 range. Connect the input leads to a 10MΩ precision resistance standard. Adjust A17R33 until the display reads 10.000.

4.2.16 Select the 100 range. Connect the input leads to a 100 MΩ precision resistance standard. Adjust A17R35 until the display reads 100.00.

## 4.3 TEST PROCEDURE

The following test procedure, or any part of it, may be performed as required. This procedure should only be performed after completing 4.2 CALIBRATION PROCEDURE. This test procedure covers the following specifications for the digital ohmmeter:

1. Temperature coefficient
2. Stability
3. Input Overload
4. Line Voltage Range
5. Reading Rate

### 4.3.1 TEMPERATURE COEFFICIENT

Allow the machine to warm-up for one hour at room temperature, 25°C, and check the full scale calibration as given in the calibration adjustment procedure. Place the unit in an environmental chamber and raise the temperature to 50°C. Allow the unit at least one hour to stabilize at 50°C and then check the calibration. The allowable full scale excursion for the Model 8303 is ±7.5 digits at full scale, after zeroing at 50°C if required, on the 1Ω through the 100KΩ ranges. It is ±17 digits on the 1MΩ range, ±37 digits on the 10MΩ range and ±275 digits on the 100MΩ range.

### 4.3.2 TIME STABILITY

Allow the 8303 to stabilize at 25°C for two hours. Connect the input to a precision full scale resistance source. Monitor the 8303 display for a 24 hour period at 25°C. The allowable excursion is: ±2 digits on the 1Ω through the

100KΩ ranges; ±5 digits on the 1MΩ range; ±10 digits on the 10MΩ range; and ±100 digits on the 100MΩ range.

### 4.3.3 INPUT OVERLOAD

Select the 100 range and the KΩ function. Connect the input to a 100KΩ precision resistance standard. Record the reading. Apply an input of 115 VAC 60 Hz. Reconnect the input to the precision resistor. The unit should return to the original reading ±2 digits within 30 seconds.

### 4.3.4 LINE VOLTAGE RANGE

The following line voltage test are made around 115 volts AC 60 Hz. If the unit is used on 230 volts AC or other than 60 Hz the test should be run at that voltage or frequency.

Connect the variac to the 115 volts AC 60 Hz line. Connect the wattmeter/voltmeter to the output of the variac and connect the 8303 to the wattmeter/voltmeter output. Apply a full scale input resistance to the 8303. Vary the line voltage from 105 to 125 volts AC and check that the total variation does not exceed: ±2 digits on the 1Ω through 1MΩ ranges; ±4 digits on the 10MΩ range and ±10 digits on the 100MΩ range.

### 4.3.5 READING RATE

Connect an oscilloscope to TP7 of the A2 board. Check that the pulses occur at 180 to 250 millisecond intervals.

## MAINTENANCE AND TROUBLESHOOTING

### 5.1 GENERAL MAINTENANCE

The CALICO 8303 Digital Ohmmeter is a solid state instrument designed to give years of trouble free service. Since the instrument has no moving parts, maintenance is limited to periodic cleaning in accordance with good commercial shop practices.

### 5.2 TROUBLESHOOTING

Experience has shown that often the difficulties encountered with equipment are poor input signals or misinterpretation of specifications. Check to be sure that the input is not noisy or erratic, and that you fully understand the characteristics of this instrument as defined in the specifications.

Only skilled personnel who have studied the theory of operation section of this manual should attempt to repair the instrument.

First check the power supplies per the table at the end of the power supply section, 3.2.12.

If the problem is not in the power supply section of the machine, check that the waveforms shown in Figure 3 are correct.

1. The ramp output is available at A2IC1 Pin 6.
2. The comparator outputs are available at A2IC2 Pin 6 and A2IC3 Pin 6.
3. The exclusive or gate output is available at A2IC7 Pin 5.
4. The count pulse train is available at A2IC4 Pin 5.
5. The time base output is available at A2TP7.
6. The load storage register signal is available at A2IC22 Pin 5.
7. The decade counter reset signal is available at A2IC22 Pin 3.

## CIRCUIT DIAGRAMS

### 6.1 GENERAL

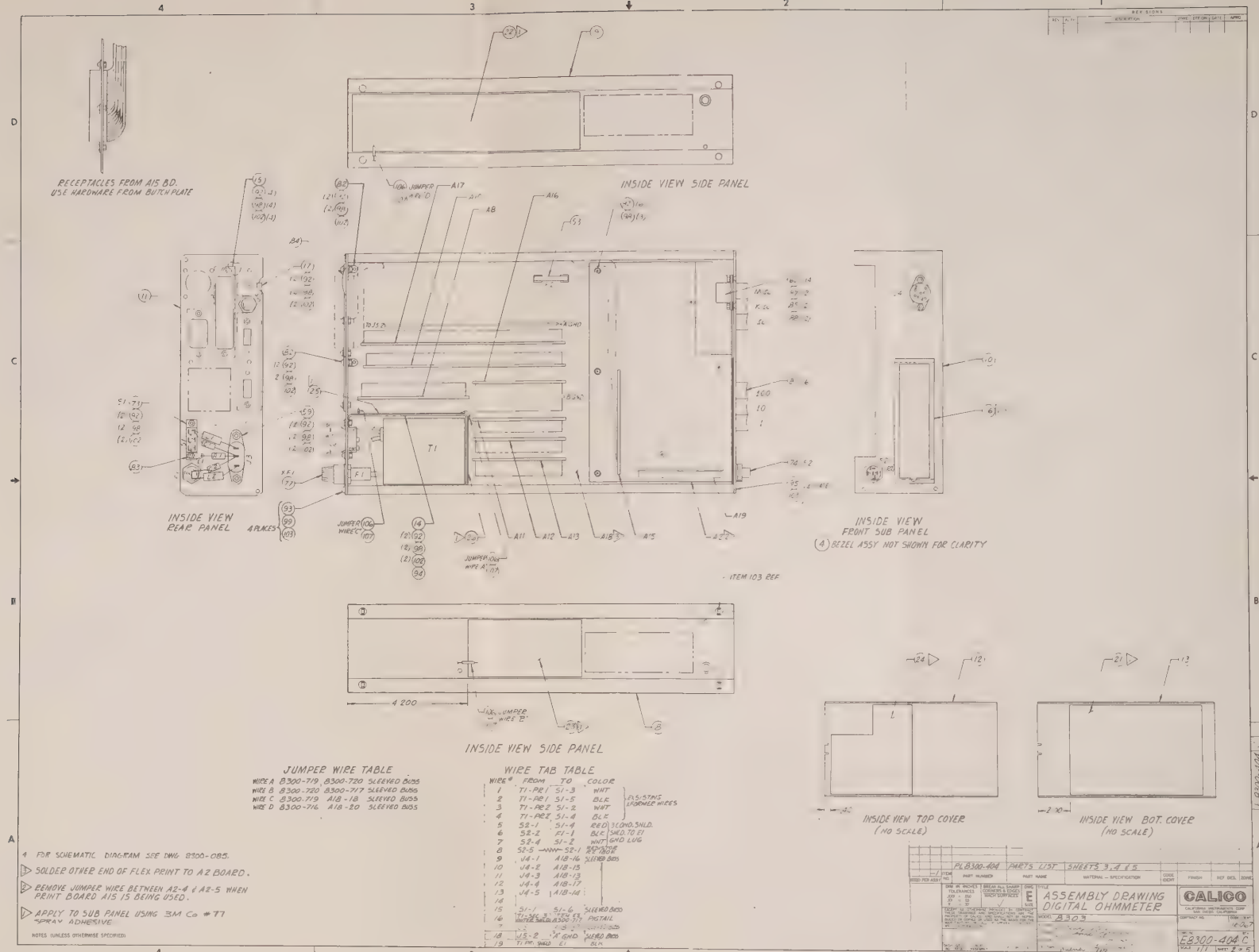
This section contains schematics and mechanical diagrams necessary for operation and maintenance of the Model 8303 Digital Ohmmeter. The schematic diagrams illustrate the circuit while the mechanical assemblies indicate the part placement.

(Applicable illustrations to the appendix sections are contained therein, not in this section.)

### 6.2 REFERENCE DESIGNATIONS

Partial reference designators are shown on schematics and mechanical drawings. Prefix these reference designators with assembly and/or sub-assembly designation for the complete reference designator. For example:

| ASSEMBLY/SUB-ASSEMBLY | COMPONENT | COMPLETE DESIGNATION |
|---|---|---|
| A1 | R1 | A1R1 |
| A7 | C10 | A7C10 |
| A10 | IC2 | A10IC2 |


RECEPTACLES FROM A15 BD.
USE HARDWARE FROM BUTCH PLATE
INSIDE VIEW SIDE PANEL
INSIDE VIEW REAR PANEL
INSIDE VIEW FRONT SUB PANEL
(4) BEZEL ASSY NOT SHOWN FOR CLARITY
ITEM 103 REF
INSIDE VIEW SIDE PANEL
INSIDE VIEW TOP COVER
(NO SCALE)
INSIDE VIEW BOT. COVER
(NO SCALE)

JUMPER WIRE TABLE

| | | |
|---|---|---|
| WIRE A | B300-719, B300-720 | SLEEVED BUSS |
| WIRE B | B300-720 B300-717 | SLEEVED BUSS |
| WIRE C | B300-719 A1B-18 | SLEEVED BUSS |
| WIRE D | B300-716 A1B-20 | SLEEVED BUSS |

WIRE TAB TABLE

| WIRE # | FROM | TO | COLOR | |
|---|---|---|---|---|
| 1 | T1-PRI | S1-3 | WHT | #26 STND. |
| 2 | T1-PRI | S1-5 | BLK | LEADWIRE WIRES |
| 3 | T1-PRI | S1-2 | WHT | |
| 4 | T1-PRI | S1-4 | BLK | |
| 5 | S2-1 | S1-1 | RED | 3 COND. SHLD. |
| 6 | S2-2 | F1-1 | BLK | SHLD. TO E1 |
| 7 | S2-4 | S1-2 | WHT | GND LUG |
| 8 | S2-5 | S2-1 | BARE | #26 HOOK UP WIRE |
| 9 | U4-1 | A1B-16 | SLEEVED BUSS | |
| 10 | U4-2 | A1B-15 | | |
| 11 | U4-3 | A1B-13 | | |
| 12 | U4-4 | A1B-17 | | |
| 13 | U4-5 | A1B-14 | | |
| 14 | | | | |
| 15 | S1-1 | S1-6 | SLEEVED BUSS | |
| 16 | T1-SEC | A3 | PIGTAIL | |
| 17 | | | | |
| 18 | V3-2 | "A" GND | SLEEVED BUSS | |
| 19 | T1 PRI. SHLD | E1 | BLK | |

NOTES (UNLESS OTHERWISE SPECIFIED)

4. FOR SCHEMATIC DIAGRAM SEE DWG B300-0B5.
2. SOLDER OTHER END OF FLEX PRINT TO A2 BOARD.
3. REMOVE JUMPER WIRE BETWEEN A2-4 & A2-5 WHEN PRINT BOARD A15 IS BEING USED.
4. APPLY TO SUB PANEL USING 3M Co #77 SPRAY ADHESIVE.

PLB300-404 PARTS LIST SHEETS 3,4 & 5

ASSEMBLY DRAWING DIGITAL OHMMETER

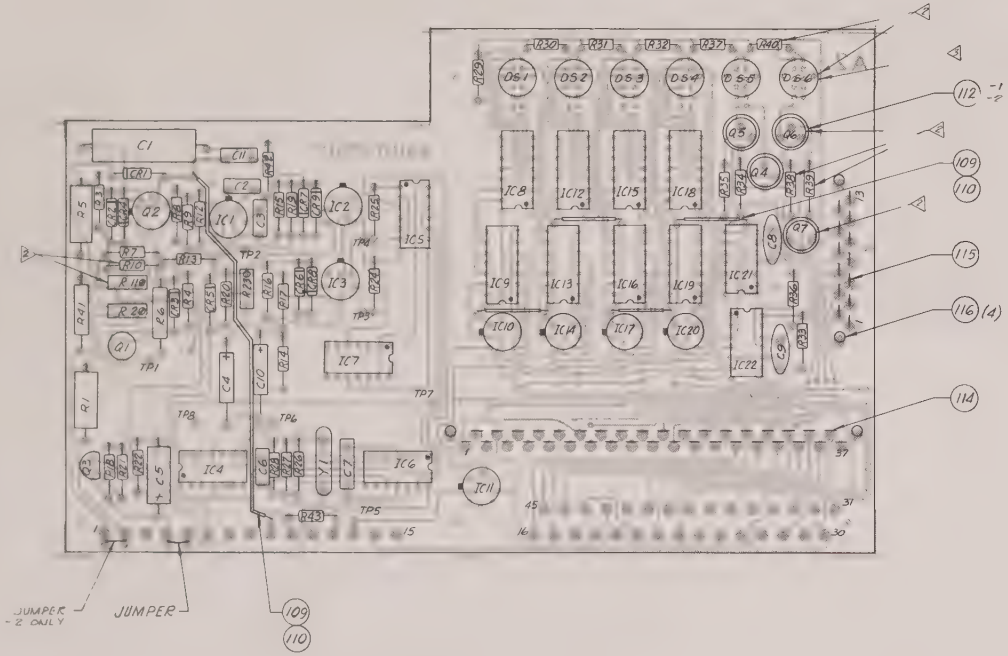
CALICO

CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

MODEL B303

SIZE E | DWG NO. B300-404 C | REV | SHEET 2 OF 5

B300-404




A2
-1 ASSEMBLY
VIEW COMPONENT SIDE

3 DS6 ± POLARITY TUBE INSTALLATION MUST MEET THE FOLLOWING REQMTS
A. "-" INDICATOR MUST BE WITHIN ± 15° OF OTHER TUBES (DS1 THRU DS5)
AVG HORZ NUMERICAL CENTERLINE
B. TUBE MUST BE ⊥ TO PC BOARD WITHIN 3° AND ALIGNED WITH DS1 THRU DS5.
2 INDICATES COMPONENTS NOT USED ON -2 ASSY (A303).

1. FOR SCHEMATIC SEE DWG. No. 8300-071 SHEETS 1, 2 & 3.

NOTES (UNLESS OTHERWISE SPECIFIED)

REVISIONS

| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRO |
|---|---|---|---|---|---|---|

PLB300-700 PARTS LIST SHEETS 4 & 5

| REQD PER ASSY | ITEM NO | PART NUMBER | PART NAME | MATERIAL - SPECIFICATION | CODE IDENT | FINISH | REF DES | ZONE |
|---|---|---|---|---|---|---|---|---|

DIM IN INCHES TOLERANCES XXX ± .010, XX ± .03, ANG ± 30' — BREAK ALL SHARP CORNERS & EDGES MACH SURFACES

DWG SIZE D

TITLE: ANALOG & DECADE P.C. BOARD ASSEMBLY (A2)

CALICO — CALIFORNIA INSTRUMENTS CORP SAN DIEGO, CALIFORNIA

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MODEL 8300 & 8303 (A2) — CONTRACT NO — CODE IDENT 16067

RELEASE E. SHULTZ 2/17/9

CHECKER J. WEBER 2/18/9 — PURCHASING

DESIGN — PROJ ENGR G. T. 2/19/9

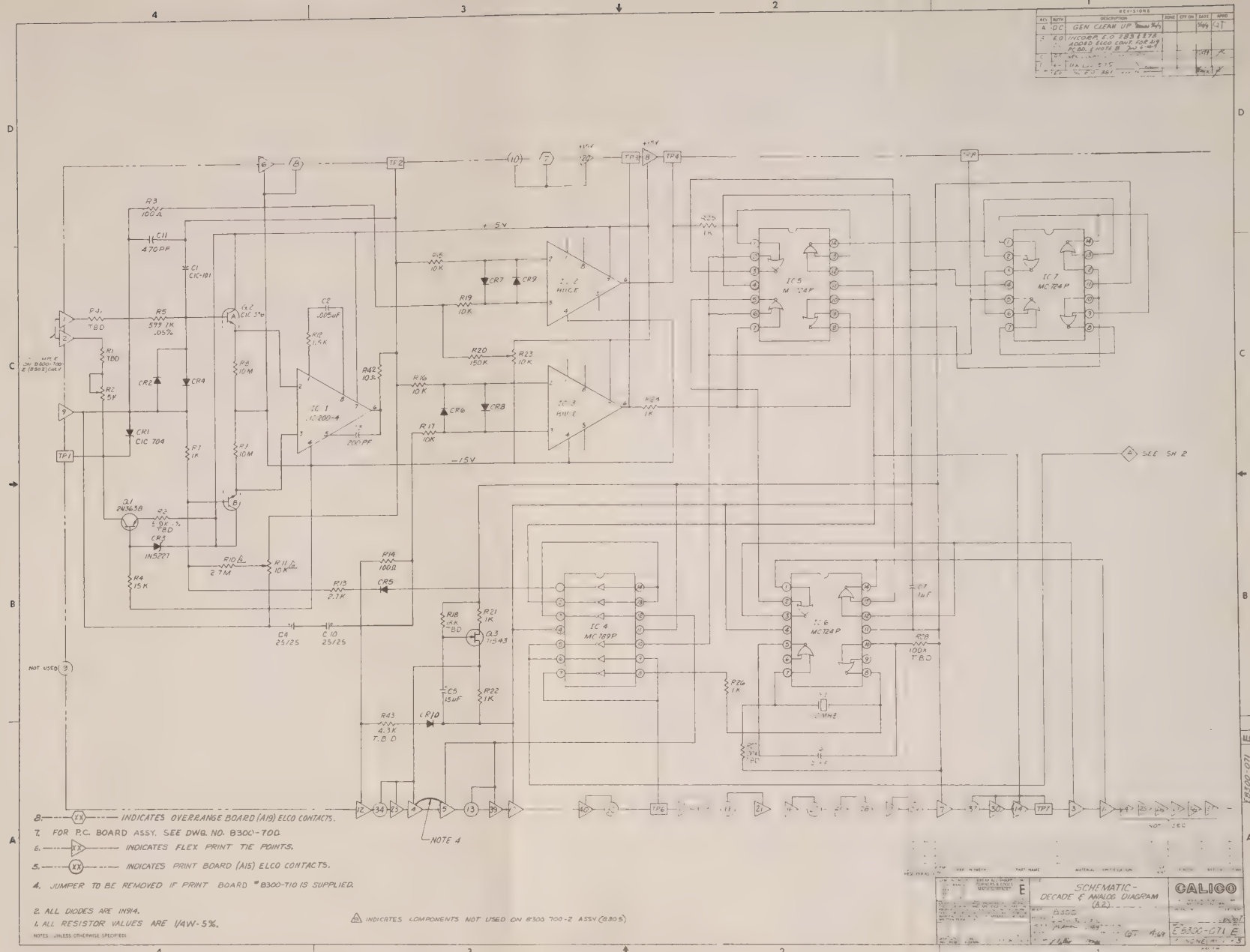
DRFTSMN T. BROWN 2/12/9 — CHF ENGR

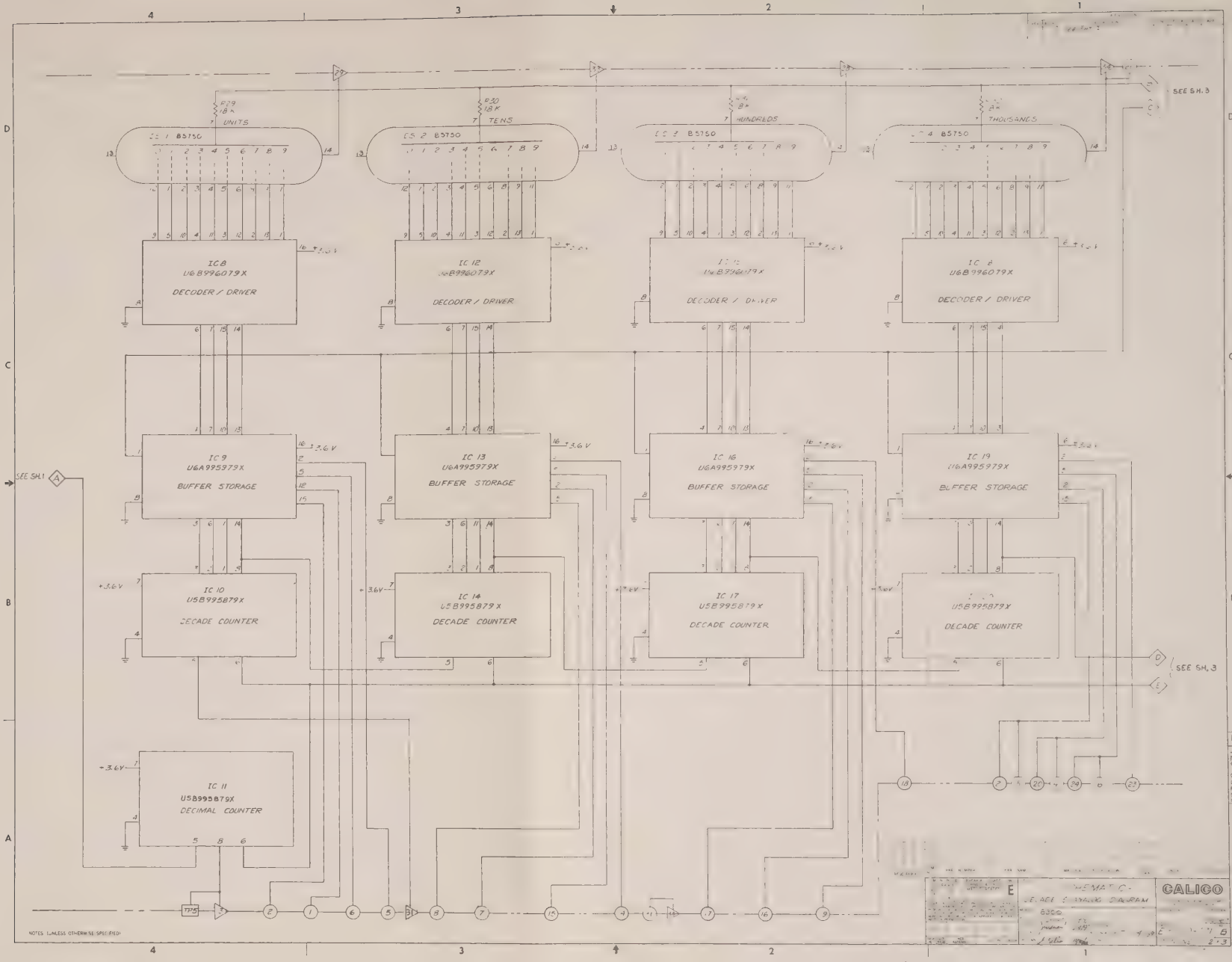
DWG NO 8300-700 — REV E

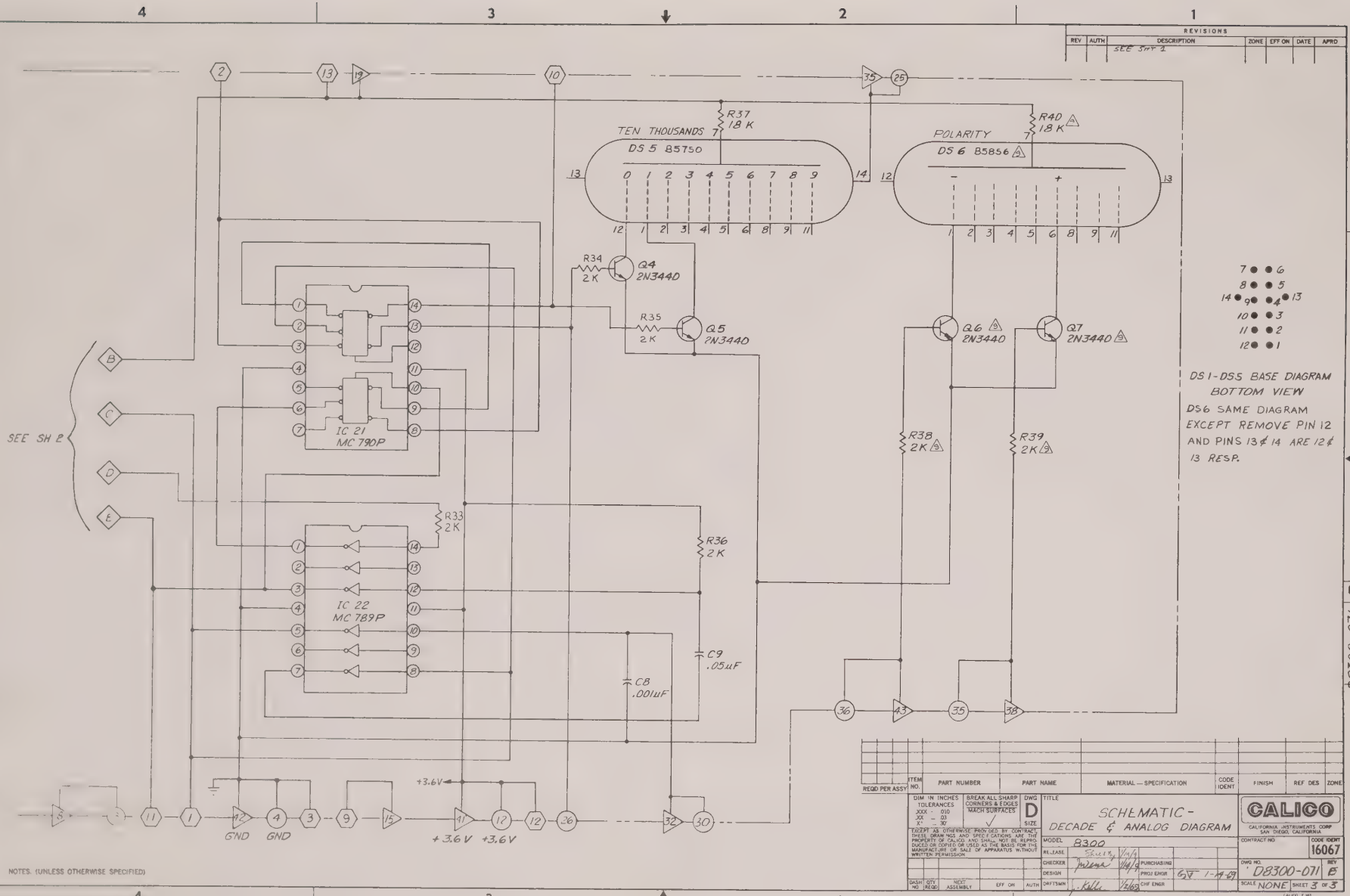
SCALE 2/1 — SHEET 2 OF 7

| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| -1 | 1 | -01-BCK | S.N. 1 | |
| -2 | 1 | -01-BCK | S.N. 1 | |

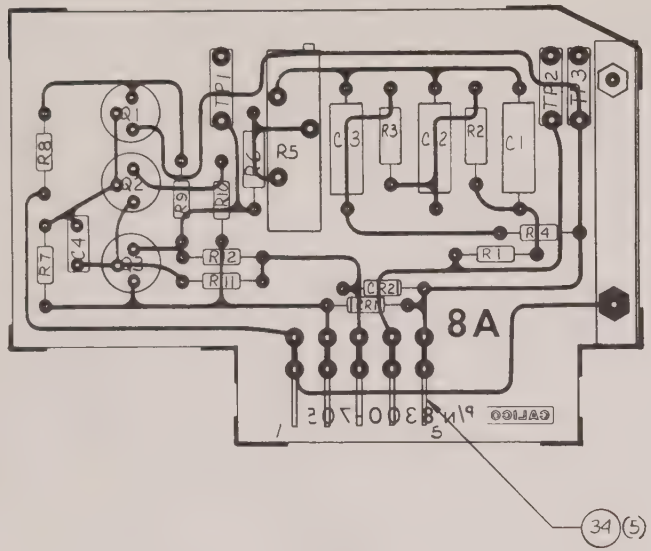
8300-700 E

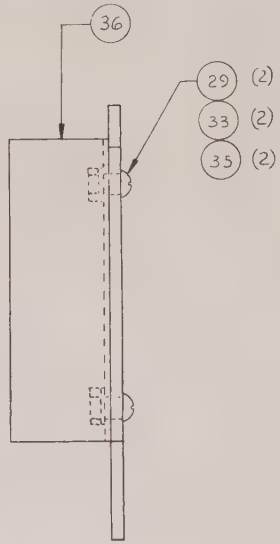

REVISIONS
REV AUTH DESCRIPTION ZONE CTY ON DATE APPD
A DC GEN CLEAN UP
B EO INCORP. E.O 3831178 ADDED ELCO CONT. FOR A/D P.C.BD. (NOTE 8)
C EO INCORP. E.O 3871
+15V
-15V
+5V
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
R1 TBD
R2 5K
R3 100Ω
R4 15K
R5 599.1K .05%
R6 10M
R7 1K
R8 10M
R9 10K
R10 2.7M
R11 10K
R12 1.5K
R13 2.7K
R14 100Ω
R15 10K
R16 10K
R17 10K
R18 1K TBD
R19 10K
R20 150K
R21 1K
R22 1K
R23 10K
R24 1K
R25 1K
R26 1K
R27 TBD
R28 100K TBD
R29 1K
R42 10K
R43 4.3K T.B.D
C1 CIC-101
C2 .005uF
C3 CIC 3pf
C4 25/125
C5 .15uF
C6 .1uF
C7 1uF
C10 25/125
C11 470PF
CR1 CIC 704
CR2
CR3 IN5227
CR4
CR5
CR6
CR7
CR8
CR9
CR10
Q1 2N3638
Q2 2N3638
Q3 TIS43
IC 1 LC 200-4
IC 2 HI11E
IC 3 HI11E
IC 4 MC789P
IC 5 MC724P
IC 6 MC724P
IC 7 MC724P
.2 MHZ
200 PF
NOT USED
SEE SH 2
NOTE 4
8. XX INDICATES OVERRANGE BOARD (A19) ELCO CONTACTS.
7. FOR P.C. BOARD ASSY. SEE DWG. NO. B300-700.
6. XX INDICATES FLEX PRINT TIE POINTS.
5. XX INDICATES PRINT BOARD (A15) ELCO CONTACTS.
4. JUMPER TO BE REMOVED IF PRINT BOARD "B300-710 IS SUPPLIED.
2. ALL DIODES ARE IN914.
1. ALL RESISTOR VALUES ARE 1/4W-5%.
NOTES: UNLESS OTHERWISE SPECIFIED
INDICATES COMPONENTS NOT USED ON #300 700-2 ASSY (B305)
SCHEMATIC - DECADE & ANALOG DIAGRAM (A2)
CALICO
B300
E B300-071 E
SCALE
SHEET 3
B300-071 E


P29 18K UNITS
P30 18K TENS
P31 18K HUNDREDS
P32 18K THOUSANDS
DS 1 B5750
DS 2 B5750
DS 3 B5750
DS 4 B5750
IC 8 U6B996079X DECODER / DRIVER
IC 12 U6B996079X DECODER / DRIVER
IC 15 U6B996079X DECODER / DRIVER
IC 2 U6B996079X DECODER / DRIVER
IC 9 U6A995979X BUFFER STORAGE
IC 13 U6A995979X BUFFER STORAGE
IC 16 U6A995979X BUFFER STORAGE
IC 19 U6A995979X BUFFER STORAGE
IC 10 U5B995879X DECADE COUNTER
IC 14 U5B995879X DECADE COUNTER
IC 17 U5B995879X DECADE COUNTER
IC 11 U5B995879X DECIMAL COUNTER
+3.6V
SEE SH.1
SEE SH.3
NOTES UNLESS OTHERWISE SPECIFIED
SCHEMATIC
CALICO
6300


REVISIONS
REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APPD
SEE SHT 2
TEN THOUSANDS
DS 5 B5750
POLARITY
DS 6 B5856
R37 18 K
R40 18 K
R34 2K
Q4 2N3440
R35 2K
Q5 2N3440
Q6 2N3440
Q7 2N3440
R38 2K
R39 2K
IC 21 MC 790P
IC 22 MC 789P
R33 2K
R36 2K
C9 .05uF
C8 .001uF
SEE SH 2
GND GND
+3.6V +3.6V +3.6V
DS 1-DS 5 BASE DIAGRAM
BOTTOM VIEW
DS6 SAME DIAGRAM
EXCEPT REMOVE PIN 12
AND PINS 13 & 14 ARE 12 &
13 RESP.
NOTES. (UNLESS OTHERWISE SPECIFIED)
SCHEMATIC -
DECADE & ANALOG DIAGRAM
CALICO
MODEL 8300
D8300-071 E
SCALE NONE SHEET 3 OF 3
CONTRACT NO 16067

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| | | | | | | |




A8
-1 ASSEMBLY
VIEW COMPONENT SIDE

2. MAX. COMPONENT HEIGHT TO BE .50
1. FOR SCH MATIC SEE DWG. NO. C8300-075.

NOTES: (UNLESS OTHERWISL SPECIFIED)

C8300-705 / B

PL8300-705 PARTS LIST SHEET 4

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| -1 | | | | | | | | |

DIM IN INCHES TOLERANCES .XXX = .010 .XX = .03 X° = 30'
BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓
DWG SIZE C

EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO, AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION.

| DASH NO. | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

TITLE: FILTER BOARD (A8)
PC BOARD ASSEMBLY
MODEL 8300

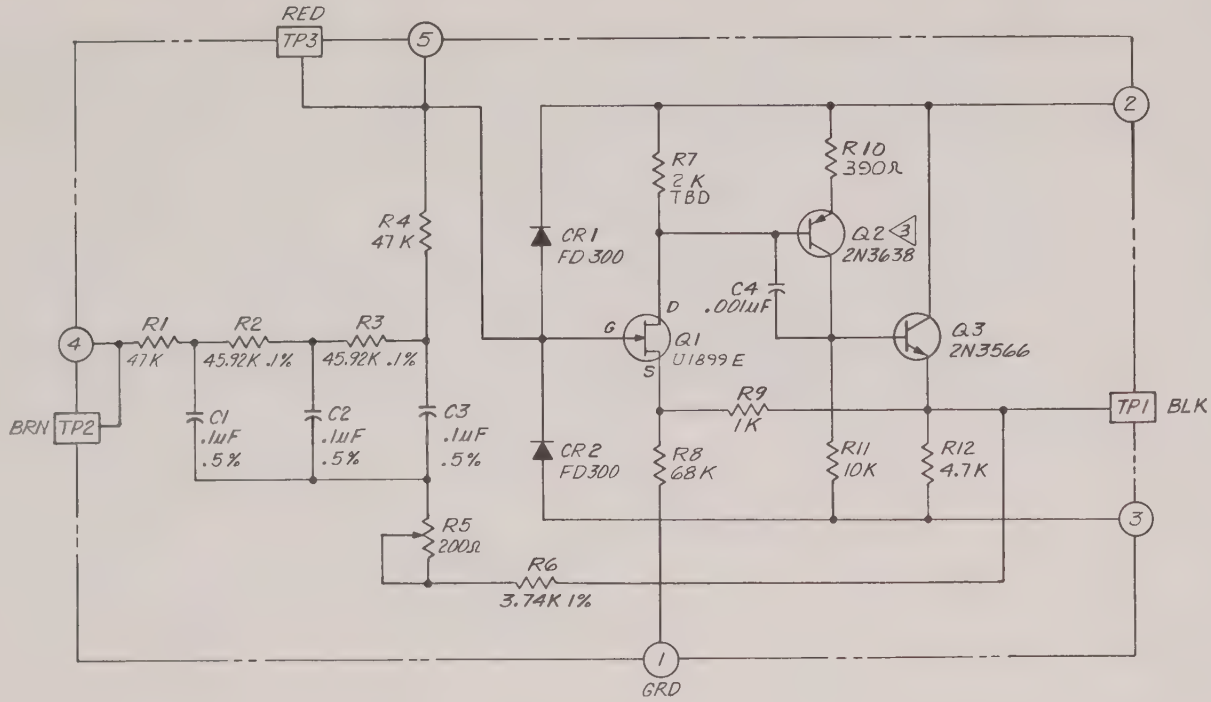
| | | | | |
|---|---|---|---|---|
| RELEASE | E Shultz | 9-7-9 | | |
| CHECKER | [illegible] | 2/2/9 | PURCHASING | |
| DESIGN | | | PROJ ENGR | [illegible] 9/16/9 |
| DRFTSMN | T BROWN | 1/16/9 | CHF ENGR | |

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO.
CODE IDENT 16067
DWG NO. C8300-705
REV /
SCALE 2/1
SHEET 2 OF 4

CALICO F-102

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| A | D.C. | GEN CLEAN UP Brown 3/19 | | | 3/10/9 | GT |
| B | E.O. | INC E.O. 363 4-7-70 | | | | |
| C | D.C. | ADDED NOTE 3 | | | 1-29-72 | |




| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|

3. SELECT FOR LOW $\frac{1}{f}$ NOISE.

2. FOR P.C. BOARD ASSY. SEE DWG. NO. 8300-705.

1. ALL RESISTORS ARE 1/4W-5%.

NOTES (UNLESS OTHERWISE SPECIFIED)

| DIM IN INCHES TOLERANCES .XXX = .010 .XX = .03 X° = 30' | BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓ | DWG SIZE C |
|---|---|---|

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| DASH NO. | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

TITLE: SCHEMATIC - FILTER (A8)

MODEL 8300

| | | | | |
|---|---|---|---|---|
| RELEASE | | | PURCHASING | |
| CHECKER | | 1/14/9 | PROJ ENGR | GT 1-17-69 |
| DESIGN | | | CHF ENGR | |
| DRFTSMN | J. Kelly | 1/14/69 | | |

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO.

CODE IDENT 16067

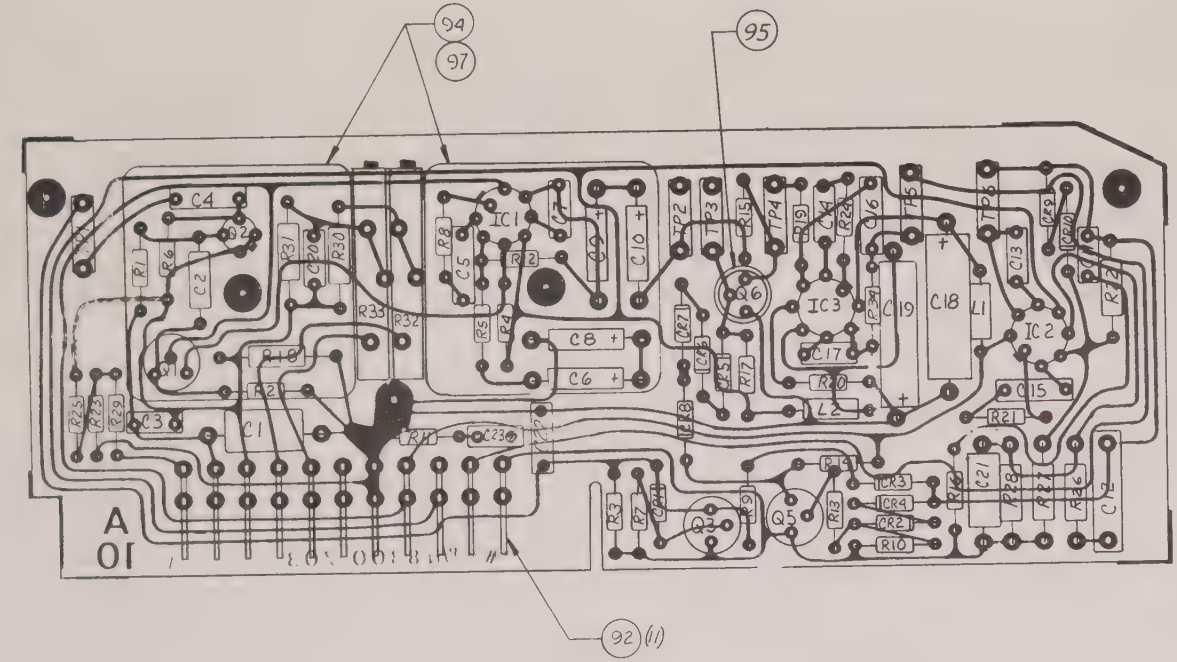
DWG NO. C 8300-075 REV C

SCALE NONE SHEET 1 OF 1

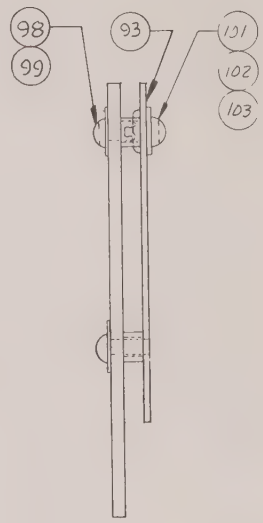
CAL CO F 102

C 8300-075 C

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| | | | | | | |




A 10
-1 ASSEMBLY
VIEW COMPONENT SIDE




END VIEW

C8300-703 A

B

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| -1 | | PL8300-703 | PARTS LIST | SHEET 4,5&6 | | | | |

| DIM IN INCHES TOLERANCES | BREAK ALL SHARP CORNERS & EDGES | DWG SIZE |
|---|---|---|
| XXX = .010<br>XX = .03<br>X° = 30' | MACH SURFACES ✓ | C |

TITLE: PREAMPLIFER BOARD (A10)
P.C. BOARD ASSEMBLY

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

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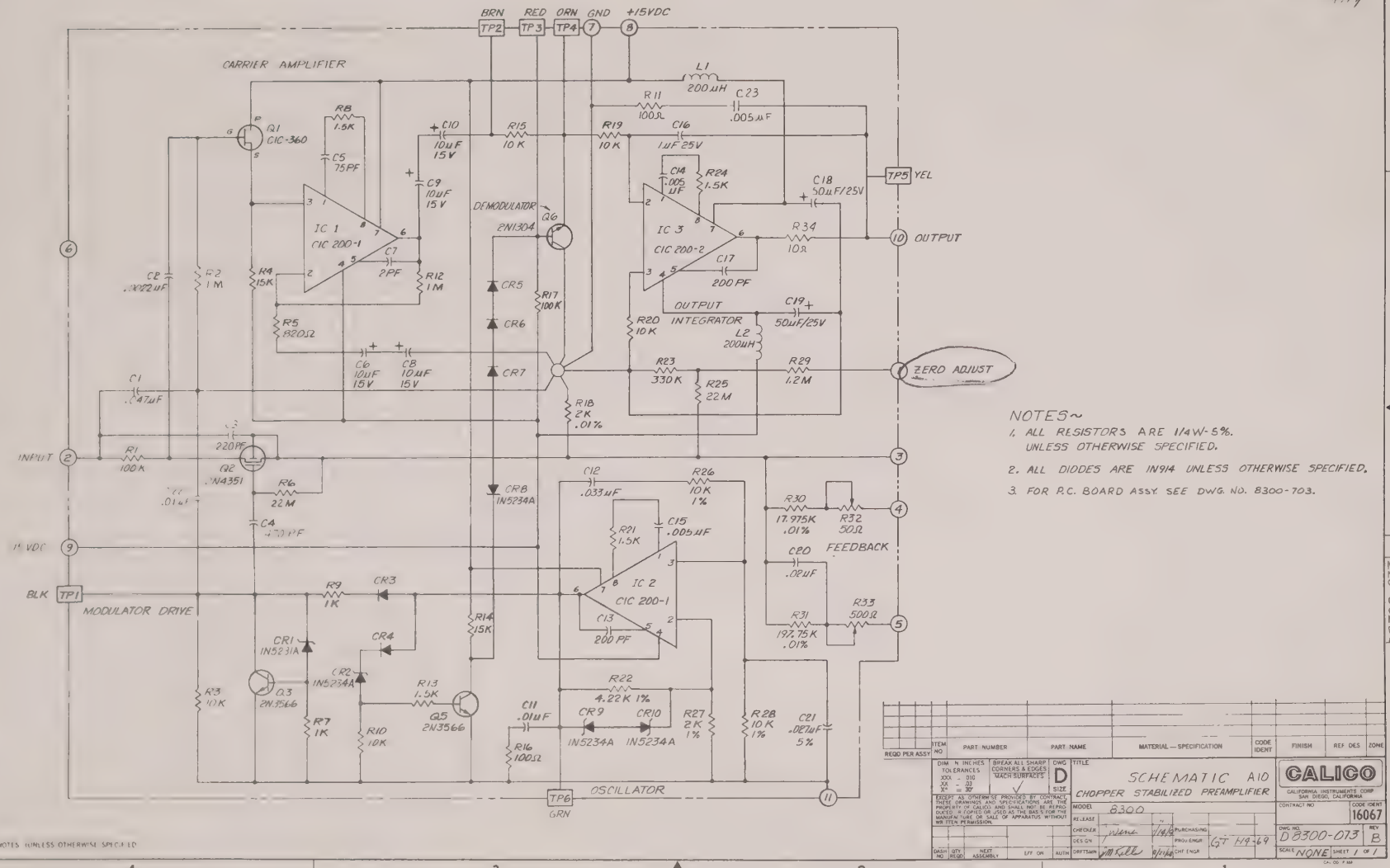
| MODEL 8300 | | | | | CONTRACT NO. | CODE IDENT |
|---|---|---|---|---|---|---|
| RELEASE | | | PURCHASING | | | 16067 |
| CHECKER | [signature] | 2/2/69 | PROJ ENGR | Cost To 2-4-69 | DWG NO. C8300-703 | REV A |
| DESIGN | | | CHF ENGR | | SCALE 2/1 | SHEET 2 OF 6 |
| DRFTSMN | T BROWN | 1/7/69 | | | | |

| DASH NO. | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

2. MAX. COMPONENT HEIGHT TO BE .62
1. FOR SCHEMATIC SEE DWG. NO. D8300-073.

NOTES: (UNLESS OTHERWISE SPECIFIED)




NOTES~

1. ALL RESISTORS ARE 1/4W-5%. UNLESS OTHERWISE SPECIFIED.
2. ALL DIODES ARE IN914 UNLESS OTHERWISE SPECIFIED.
3. FOR P.C. BOARD ASSY. SEE DWG. NO. 8300-703.

NOTES UNLESS OTHERWISE SPECIFIED

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRO |
| A | DC | GEN CLEAN UP "Brown" | | | 5/11/71 | |
| B | DC | ECN 5000 WAS 691 | | | 6/4/71 | |

| ITEM NO | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES | ZONE |
|---|---|---|---|---|---|---|---|

REQD PER ASSY

DIM IN INCHES TOLERANCES XXX - .010 XX - .03 X° = 30'

BREAK ALL SHARP CORNERS & EDGES MACH SURFACES √

DWG SIZE D

TITLE SCHEMATIC A10
CHOPPER STABILIZED PREAMPLIFIER

CALICO
CALIFORNIA INSTRUMENTS CORP SAN DIEGO, CALIFORNIA

MODEL 8300

CONTRACT NO

CODE IDENT 16067

DWG NO D8300-073 REV B

SCALE NONE SHEET 1 OF 1

RELEASE

CHECKER Wane 1/4/71 PURCHASING

DES'GN PROJ ENGR GT 1/4/71

DRFT'SMN CHF ENGR 8/11/71

DASH NO | QTY REQD | NEXT ASSEMBLY | LFT OR | AUTH

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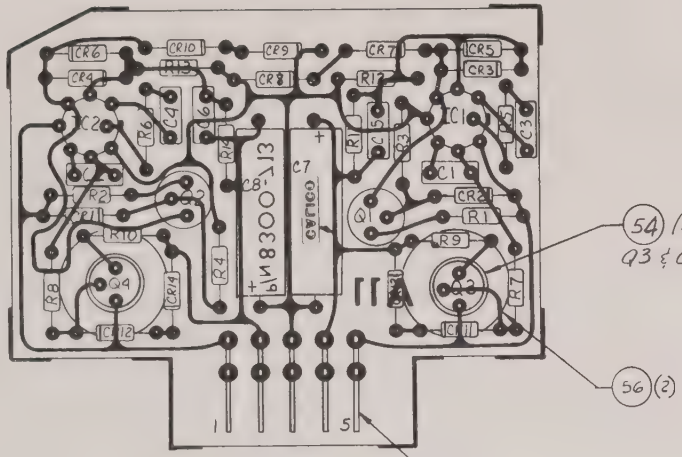
8300-073 B

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| | | | | | | |




A II
-1 ASSEMBLY
VIEW COMPONENT SIDE

D8300-713 / B

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| -1 | | PL8300-713 | PARTS LIST | SHEET 4 | | | | |

DIM IN INCHES TOLERANCES: XXX = .010, XX = .03, X° = 30'
BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓
DWG SIZE: C

TITLE: POWER SUPPLY #3 (A11) P.C. BOARD ASSEMBLY

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

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MODEL

| | | | | |
|---|---|---|---|---|
| RELEASE | E. Smith | 4/7/69 | | |
| CHECKER | Werner | 3/12/69 | PURCHASING | |
| DESIGN | | | PROJ ENGR | |
| DRFTSMN | [illegible] | 1/29/69 | CHF ENGR | |

CONTRACT NO. | CODE IDENT 16067

DWG NO. C8300-713 | REV /

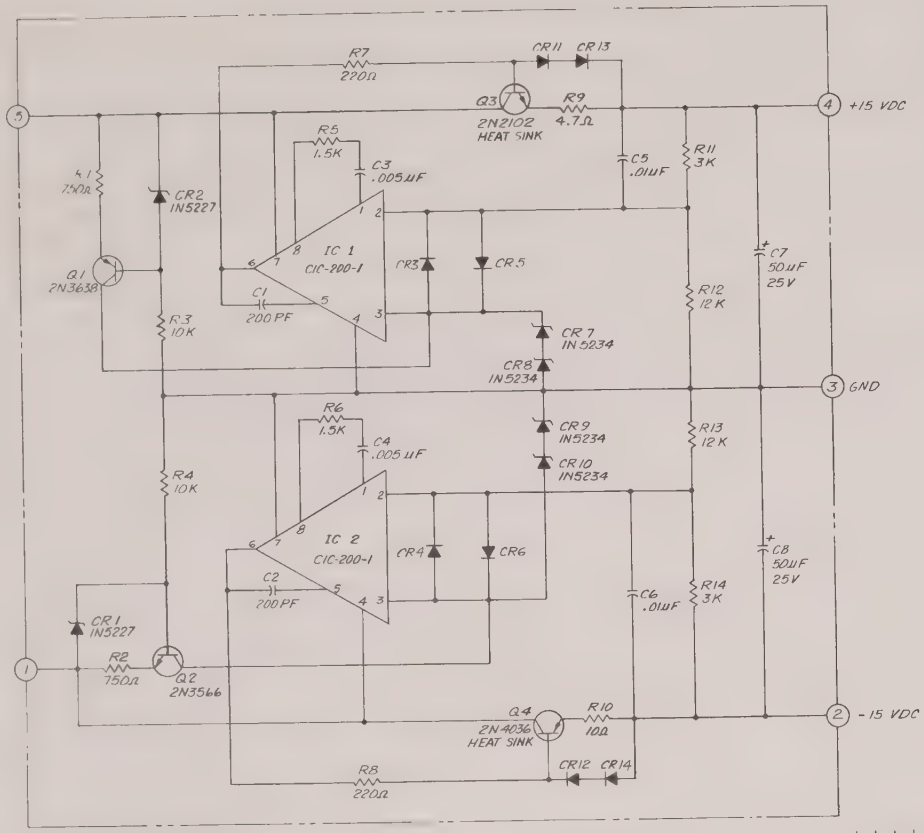
SCALE 2/1 | SHEET 2 OF 5

| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

CALICO F 102

1. MAX. COMPONENT HEIGHT TO BE .45
2. [illegible] SCHEMATIC SEE DWG. NO. D8300 C83.

NOTES: (UNLESS OTHERWISE SPECIFIED)




3. FOR P.C. BOARD ASSY SEE DWG. NO. B300-713.
2. ALL DIODES ARE IN914.
1. ALL RESISTORS ARE 1/4 W 5%.

NOTES: (UNLESS OTHERWISE SPECIFIED)

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APPD |
| A | DC | GEN CLEAN UP (Drawn) | | | 7/1/9 | |

| ITEM NO | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES | ZONE |
|---|---|---|---|---|---|---|---|

REQD PER ASSY

DIM IN INCHES TOLERANCES XXX .010 XX .03 X .1° | BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓ | DWG SIZE D

EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO AND ARE LOANED IN BEING SUBMITTED ON THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION.

TITLE: SCHEMATIC - POWER SUPPLY NO. 3 (All)

MODEL: B300

RELEASE: [illegible] 1/14

CHECKER: [illegible] 1/14/9 PURCHASING

DESIGN: PROJ ENGR

DRFTSMN: D. Kelly 1/9/69 CHF ENGR

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

CONTRACT NO

CODE IDENT 16067

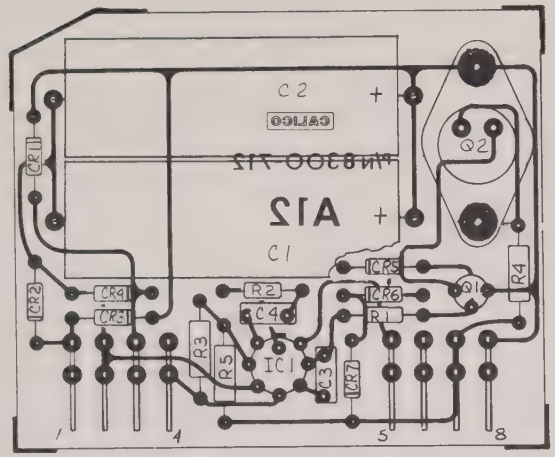
DWG NO D 8300-083 REV /

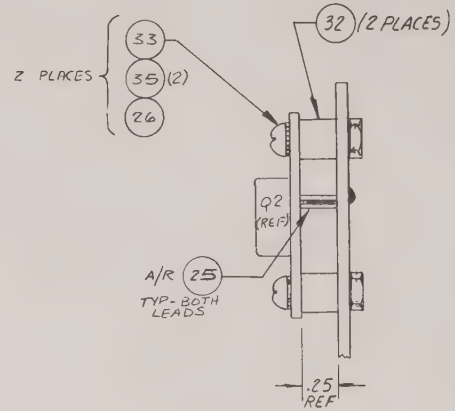
SCALE NONE SHEET 1 OF 1

DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH

D8300-083 /

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |




A12
-1 ASSEMBLY
VIEW COMPONENT SIDE

2. MAX. COMPONENT HEIGHT TO BE .80

1. FOR SCHEMATIC SEE DWG. NO. C8300-082

NOTES: (UNLESS OTHERWISE SPECIFIED)

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| -1 | | PL8300-712 | PARTS LIST | SHEET 4 | | | | |

| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

DIM IN INCHES TOLERANCES: .XXX = .010, .XX = .03, X° = 30'
BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓
DWG SIZE C

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TITLE: POWER SUPPLY #2 (A12) P.C. BOARD ASSEMBLY

| | | | | |
|---|---|---|---|---|
| MODEL | 8300 | | | |
| RELEASE | E Stout | 7/1/69 | | |
| CHECKER | J Wenner | 2/12/69 | PURCHASING | |
| DESIGN | | | PROJ ENGR | G.T.O. 7/2/69 |
| DRFTSMN | T BROWN | 1/16/69 | CHF ENGR | |

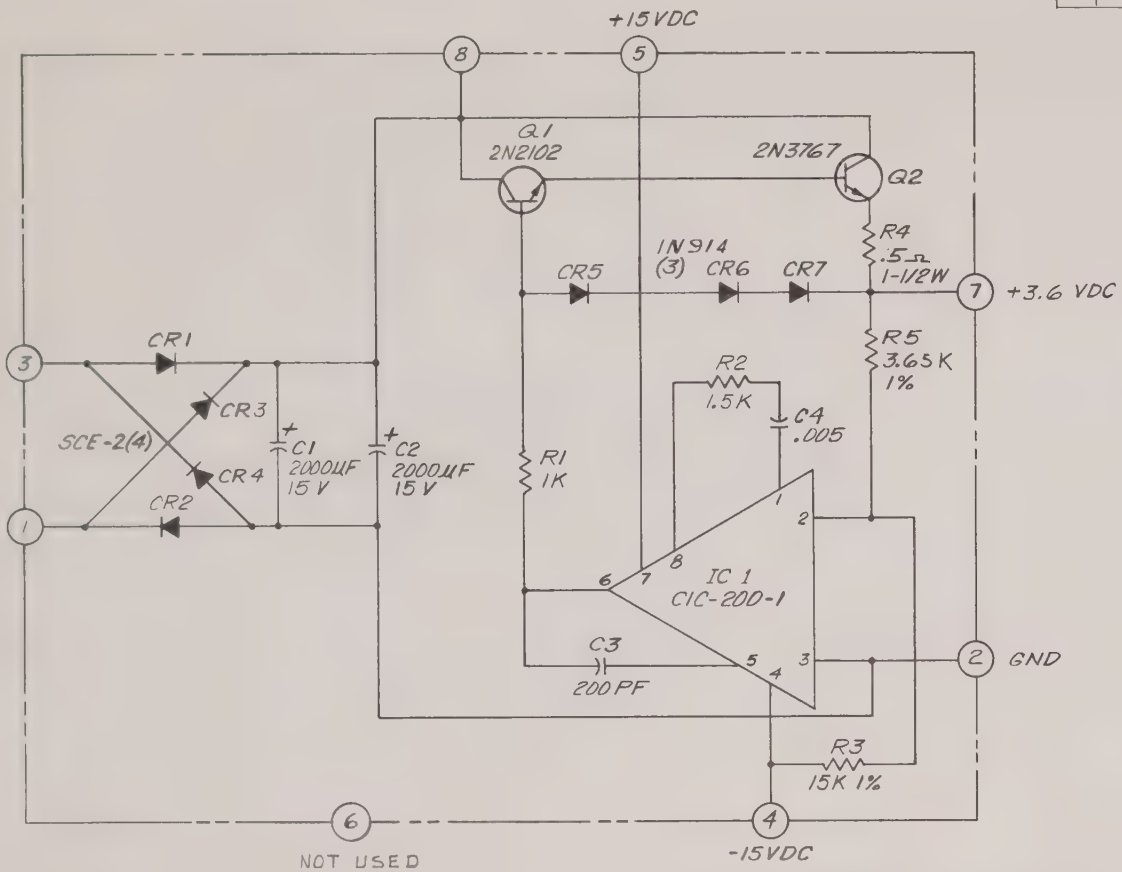
CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO.
CODE IDENT 16067
DWG NO. C8300-712
REV C
SCALE 2/1
SHEET 2 OF 4

C8300-712 C

CALICO F-102

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| A | D.C. | GEN CLEAN UP T BROWN 3/11/69 | | | 3/11/69 | |
| B | E.O. | INC E.O. 284 MM 8/20/69 | | | | |
| C | E.O. | INC E.O. 345 11-7-70 | | | | |




| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|

2. FOR P.C. BOARD ASSY. SEE DWG. NO. 8300-712.

1. ALL RESISTORS ARE 1/4W-5%.

NOTES: (UNLESS OTHERWISE SPECIFIED)

| DIM IN INCHES TOLERANCES | BREAK ALL SHARP CORNERS & EDGES | DWG SIZE |
|---|---|---|
| XXX = .010<br>XX = .03<br>X° = 30' | MACH SURFACES ✓ | C |

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| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

TITLE: SCHEMATIC POWER SUPPLY NO. 2 (A12)

MODEL: 8300

| | | | | |
|---|---|---|---|---|
| RELEASE | E. Shuri | 1/14/69 | | |
| CHECKER | J. Wiener | 11/4/68 | PURCHASING | |
| DESIGN | | | PROJ ENGR | GT 1-14-69 |
| DRFTSMN | J. Kelly | 12/11/68 | CHF ENGR | |

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO.

CODE IDENT 16067

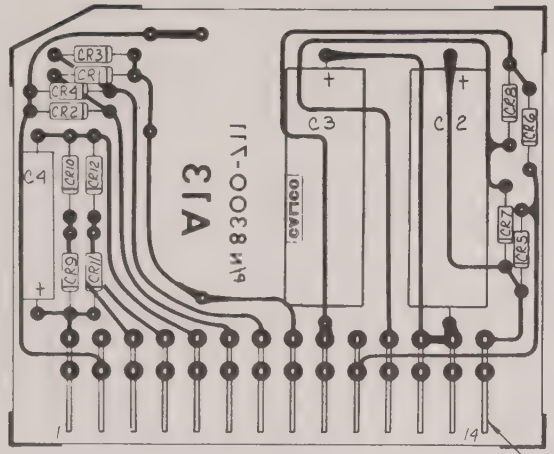
DWG NO. C8300-082 REV C

SCALE NONE SHEET 1 OF 1

CALICO F-102

C8300-082 C

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| | | | | | | |




28 (14)

A13
-1 ASSEMBLY
VIEW COMPONENT SIDE

C8300-711 C

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| -1 | | PL 8300-711 | PARTS LIST | SHEET 4 | | | | |

| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

DIM IN INCHES
TOLERANCES
.XXX — .010
.XX = .03
X° = 30'

BREAK ALL SHARP CORNERS & EDGES
MACH SURFACES ✓

DWG SIZE C

TITLE POWER SUPPLY #1
P.C. BOARD ASSEMBLY (A13)

MODEL 8300

| | | | |
|---|---|---|---|
| RELEASE | Ernest | 7/7/9 | |
| CHECKER | Petersen | 7/12/9 | PURCHASING |
| DESIGN | | | PROJ ENGR |
| DRFTSMN | T. BROWN | 7/5/9 | CHF ENGR |

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO
CODE IDENT 16067
DWG NO. C8300-711
REV C
SCALE 2/1
SHEET 2 OF 4

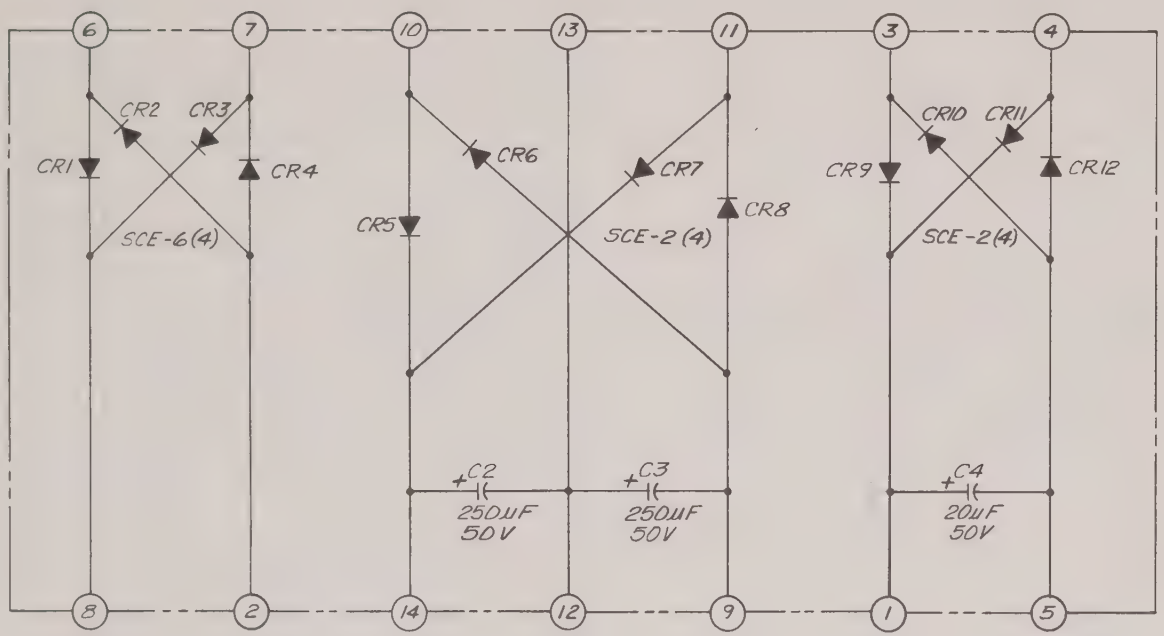
EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION.

2. MAX. COMPONENT HEIGHT TO BE .80
1. FOR SCHEMATIC SEE DWG NO. C8300-081

NOTES: (UNLESS OTHERWISE SPECIFIED)

CALICO F-102

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| A | G.A | INC E.O 350 1-16-70 | | | | CHK. JW |




2. FOR PC. BOARD ASSY. SEE DWG. NO. 8300-711.

1. ALL RESISTORS ARE 1/4W-5%.

NOTES: (UNLESS OTHERWISE SPECIFIED)

| ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|
| REQD PER ASSY | | | | | | | |

DIM IN INCHES TOLERANCES .XXX = .010, .XX = .03, X° = 30' | BREAK ALL SHARP CORNERS & EDGES MACH SURFACES | DWG SIZE C

EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION.

| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

TITLE: SCHEMATIC POWER SUPPLY NO. 1 (A13)

MODEL 8300

| | | | |
|---|---|---|---|
| RELEASE | [illegible] | 1/14/69 | |
| CHECKER | [illegible] | 1/14/69 | PURCHASING |
| DESIGN | [illegible] | | PROJ ENGR GT 1-14-69 |
| DRFTSMN | J. Fuller | 1/14/69 | CHF ENGR |

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO. | CODE IDENT 16067

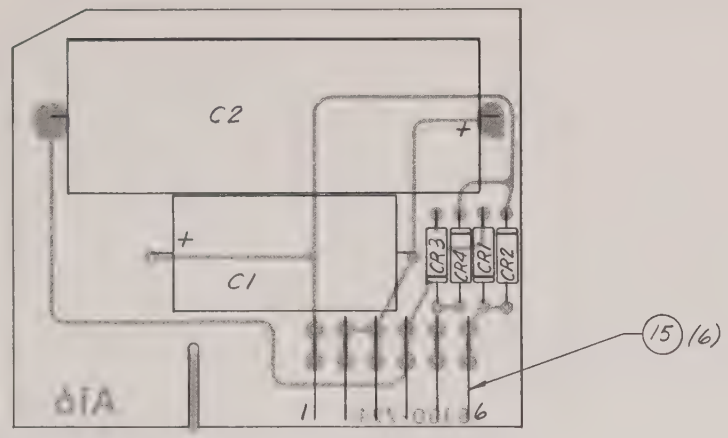
DWG NO. C8300-081 | REV A

SCALE NONE | SHEET 1 OF 1

CALICO F-102

C8300-081 A

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| | | | | | | |




A16
-1 ASSEMBLY
VIEW COMPONENT SIDE

2. MAX. COMPONENT HEIGHT TO BE 1.06
1. FOR SCHEMATIC SEE DWG. No. 8300-087.

NOTES: (UNLESS OTHERWISE SPECIFIED)

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| / | -1 | PL8300-724 | PARTS LIST | SHEET 4 | | | | |

| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| -1 | 1 | 8300-404-1 | | |

DIM IN INCHES TOLERANCES XXX = .010 XX = .03 X° = 30'
BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓
DWG SIZE C

EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION.

TITLE: POWER SUPPLY (A16) P.C. BOARD ASSEMBLY

MODEL 8303
RELEASE
CHECKER 7/14/72 PURCHASING
DESIGN PROJ ENGR
DRFTSMN 4/11/72 CHF ENGR

CALICO
CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

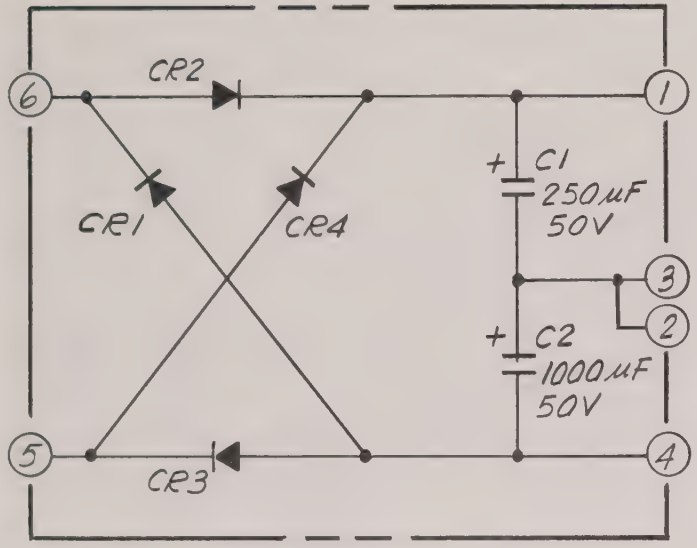
CONTRACT NO. | CODE IDENT 16067
DWG NO. C8300-724 | REV B
SCALE 2/1 | SHEET 2 OF 4

CALICO F 102

C8300-724 B

B8300-087 A

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| A | EO 496 | CHANGED NOTE 1, SCE1 TO 2 | | 9-12-70 | | |




| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

2. FOR P.C. BOARD ASSY SEE DWG. B300-724

1. DIODES ARE SCE-2

NOTES: (UNLESS OTHERWISE SPECIFIED)

| DIM IN INCHES TOLERANCES | BREAK ALL SHARP CORNERS & EDGES | DWG SIZE |
|---|---|---|
| .XXX = .010<br>.XX = .03<br>X° = 30′ | MACH SURFACES √ | B |

EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION.

| DASH NO. | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

TITLE: SCHEMATIC A16 POWER SUPPLY BD.

MODEL 8303

| | | | | | |
|---|---|---|---|---|---|
| RELEASE | [illegible] | 7/15/69 | | | |
| CHECKER | [illegible] | 7/15/69 | PURCHASING | | |
| DESIGN | | | PROJ ENGR | [illegible] | 7/14/69 |
| DRFTSMN | [illegible] | 3/18/69 | CHF ENGR | | |

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO.

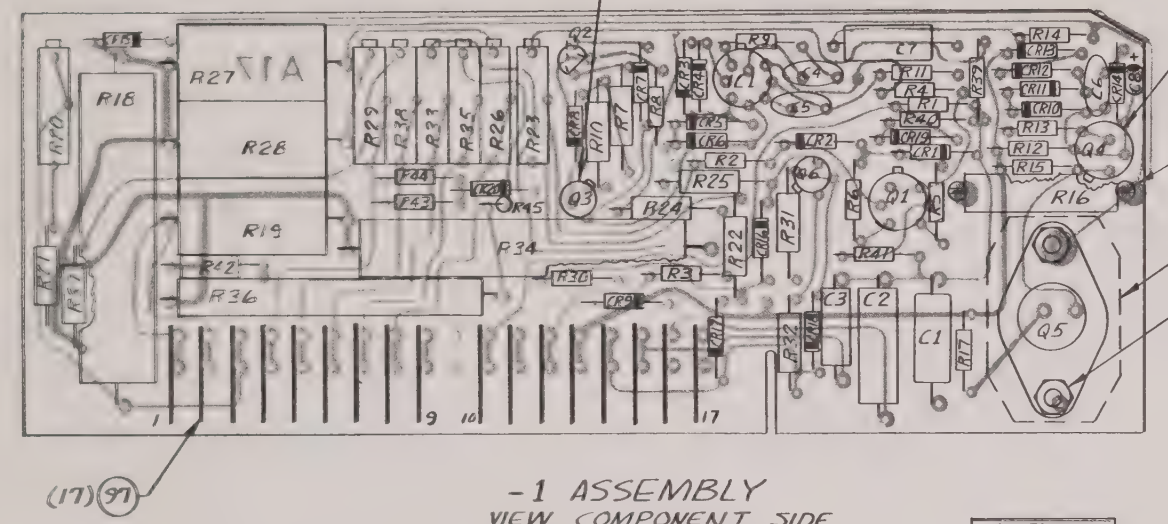
CODE IDENT 16067

DWG NO. B8300-087 REV A

SCALE — SHEET 1 OF 1

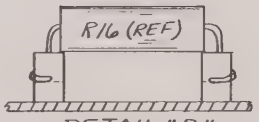
CALICO F-101

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| | | | | | | |




-1 ASSEMBLY
VIEW COMPONENT SIDE
[TOP CLAD DELETED FOR CLARITY]

A17




DETAIL "A"

C8300-723 E

| REQD PER ASSY | ITEM NO | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| -1 | | PL8300-723-1 | PARTS LIST | SHEETS 4, 5, & 6 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DASH NO. | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH | | | |

DIM IN INCHES
TOLERANCES
.XXX ± .010
.XX ± .03
X° ± 30'

BREAK ALL SHARP CORNERS & EDGES
MACH SURFACES ✓

DWG SIZE C

TITLE: BOARD ASSY, CONSTANT CURRENT
A17

MODEL 8303

RELEASE
CHECKER — PURCHASING
DESIGN — PROJ ENGR
DRFTSMN — CHF ENGR

CALICO
CALIFORNIA INSTRUMENTS CORP.
SAN DIEGO, CALIFORNIA

CONTRACT NO.
CODE IDENT 16067
DWG NO. C8300-723
REV. E
SCALE 2:1
SHEET 2 OF 6

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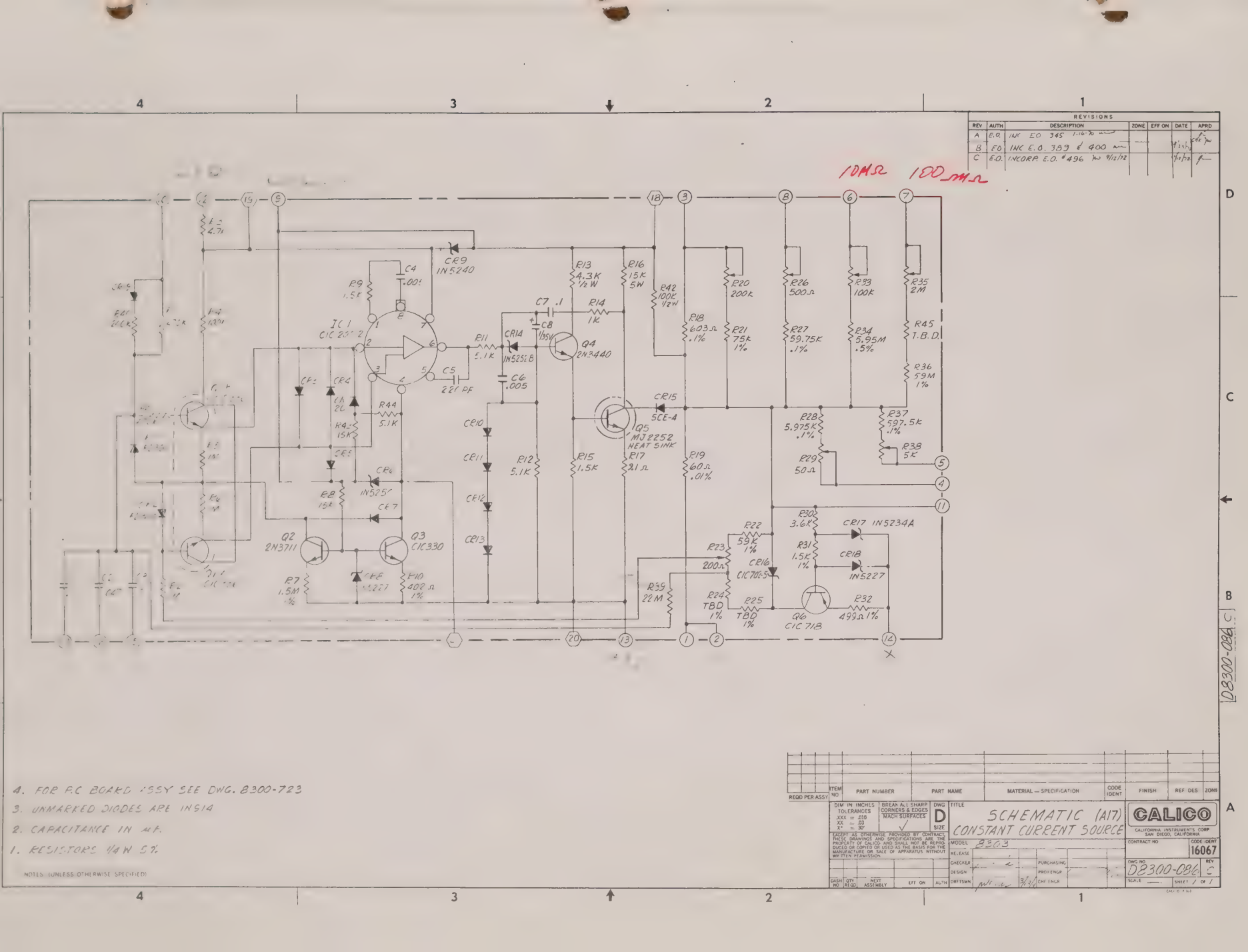
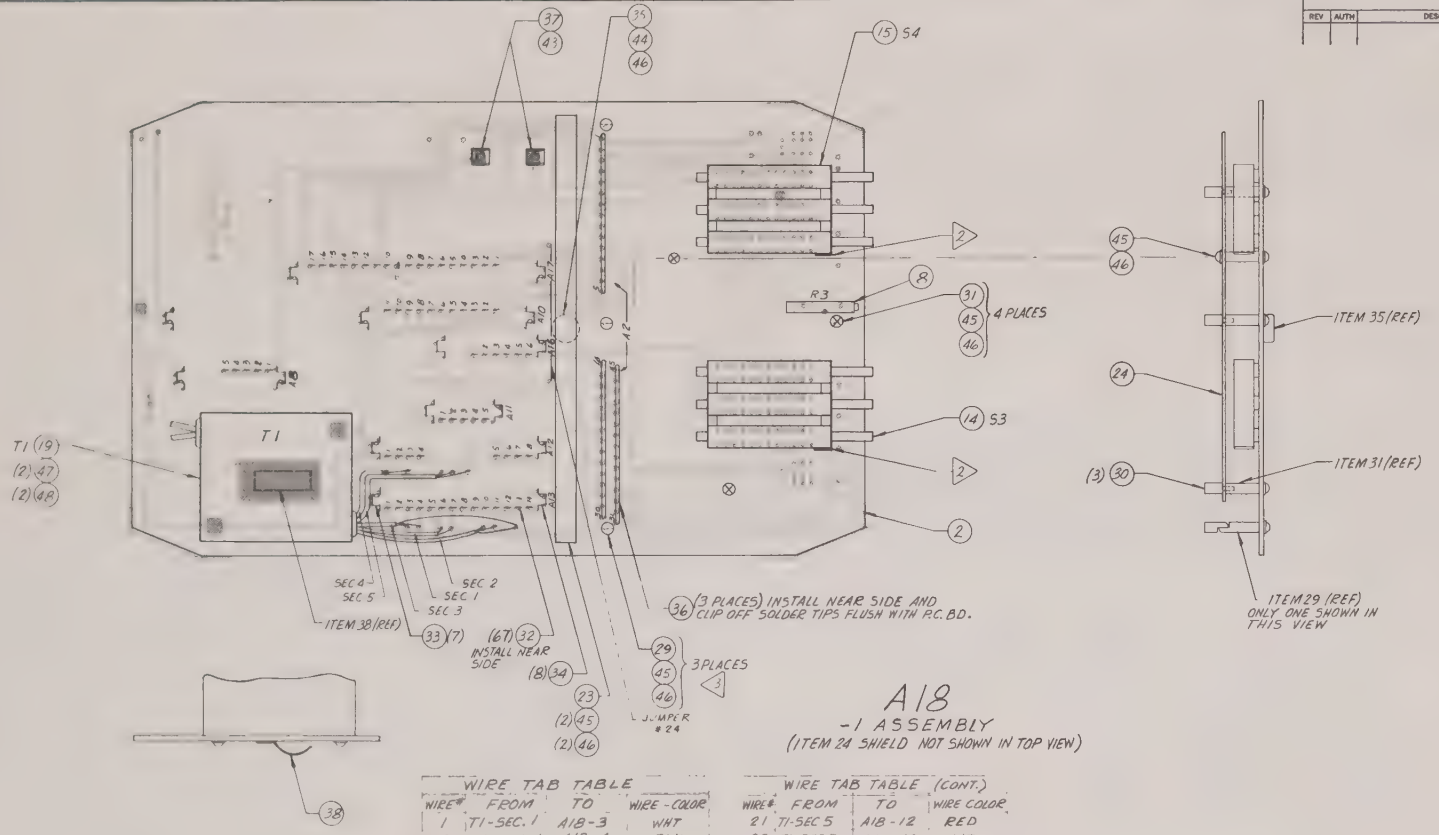
CALICO F-102

1. FOR SCHEMATIC DIAGRAM, SEE DWG NO. D8300-086.

NOTES: UNLESS OTHERWISE SPECIFIED


REVISIONS
REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD
A | E.O. | INC E.O. 345 | | | |
B | E.O. | INC E.O. 389 & 400 | | | |
C | E.O. | INCORP. E.O. #496 | | | 9/12/72 |
10MΩ 100MΩ
IC1 CIC 2??
Q1 CIC 704
Q2 2N3711
Q3 CIC330
Q4 2N3440
Q5 MJ2252 HEAT SINK
Q6 CIC 718
CR9 IN5240
CR14 IN5258
CR15 SCE-4
CR16 CIC 705
CR17 IN5234A
CR18 IN5227
CR8 IN5257
R13 4.3K ½W
R16 15K 5W
R42 100K ½W
R20 200K
R26 500Ω
R33 100K
R35 2M
R45 1.8.D.
R36 59M 1%
R18 603Ω .1%
R21 75K 1%
R27 59.75K .1%
R34 5.95M .5%
R14 1K
C7 .1
C8 1/15V
R11 2.1K
C5 22? PF
C6 .005
R44 5.1K
R12 5.1K
R15 1.5K
R17 2.1Ω
R19 60Ω .01%
R28 5.975K .1%
R29 50Ω
R37 597.5K .1%
R38 5K
R30 3.6K
R22 59K 1%
R23 200Ω
R24 TBD 1%
R25 TBD 1%
R31 1.5K 1%
R32 499Ω 1%
R39 22M
R7 1.5M 1%
R10 402Ω 1%
4. FOR P.C. BOARD ASSY SEE DWG. 8300-723
3. UNMARKED DIODES ARE IN914
2. CAPACITANCE IN μF.
1. RESISTORS 1/4 W 5%
NOTES: UNLESS OTHERWISE SPECIFIED
ITEM NO | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES | ZONE
REQD PER ASSY
DIM IN INCHES TOLERANCES .XXX ± .010 XX ± .03 X° ± 30'
BREAK ALL SHARP CORNERS & EDGES MACH SURFACES
DWG SIZE D
TITLE SCHEMATIC (A17) CONSTANT CURRENT SOURCE
MODEL 2303
CALICO CALIFORNIA INSTRUMENTS CORP SAN DIEGO, CALIFORNIA
CONTRACT NO
CODE IDENT 16067
DWG NO D2300-086
REV C
SCALE —
SHEET 1 OF 1
CHECKER
DESIGN
DRFTSMN
PURCHASING
PROFENGR
CHF ENGR
3/3/72
DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | ALTN
EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION.
D2300-086 C




# A18
## -1 ASSEMBLY
(ITEM 24 SHIELD NOT SHOWN IN TOP VIEW)

WIRE TAB TABLE

| WIRE # | FROM | TO | WIRE - COLOR |
|---|---|---|---|
| 1 | T1-SEC.1 | A18-3 | WHT |
| 2 | T1-SEC.1 | A18-4 | BLK |
| 3 | T1-SEC.2 | A18-5 | RED |
| 4 | T1-SEC.2 | A18-6 | BLK |
| 5 | T1-SEC.2 | A18-7 | WHT |
| 6 | T1-SEC.3 | A18-1 | BLK |
| 7 | T1-SEC.3 | A18-2 | WHT |
| 8 | T1-SEC.3 INNER SHIELD | A18-7 | #22 SLEEVED BUSS |
| 9 | T1-SEC.3 OUTER SHIELD | 3" PIG TAIL | #22 SLEEVED BUSS |
| 10 | T1-SEC.4 | A18-8 | BLK |
| 11 | T1-SEC.4 | A18-9 | WHT |
| 12 | A18-13 | OTHER END NOT CONNECTED | #22 SLEEVED BUSS 4" LG |
| 13 | A18-14 | " | 4" LG |
| 14 | A18-15 | " | 4" LG. |
| 15 | A18-16 | " | 8" LG. |
| 16 | A18-17 | " | 8" LG. |
| 17 | A18-18 | " | 2" LG. |
| 18 | A18-19 | " | 4" LG. |
| 19 | A18-20 | " | 2" LG. |
| 20 | A18-33 | " | 4" LG |

WIRE TAB TABLE (CONT.)

| WIRE # | FROM | TO | WIRE COLOR |
|---|---|---|---|
| 21 | T1-SEC 5 | A18-12 | RED |
| 22 | T1-SEC 5 | A18-10 | WHT |
| 23 | T1-SEC 5 | A18-11 | BLK |
| 24 | A18-"B" GRD | A18-"A" GRD | # 22 SLEEVED BUSS |

3. RD HD SIDE OF RIVET ON HINGED STANDOFF TO BE ON ELEKTRIP SIDE RAILW SIDE OF RIVET TO BE FACING SIDE RAIL OF UNIT.

4. MOUNT PUSH BUTTON SWITCHES 1/16 OFF BOARD, WITH LATCHING SPRING FACING UP.

1. FOR SCHEMATIC SEE DWG. NO. 8300-085

NOTES (UNLESS OTHERWISE SPECIFIED)

REVISIONS

| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
|---|---|---|---|---|---|---|

PLB300-722 PARTS LIST SHEET 4 OF 5

| REQD PER ASSY | ITEM NO | PART NUMBER | PART NAME | MATERIAL - SPECIFICATION | CODE IDENT | FINISH | REF DES | ZONE |
|---|---|---|---|---|---|---|---|---|

DIM IN INCHES TOLERANCES: XXX ± .010, XX ± .03, X° ± 30'
BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓
DWG SIZE D

TITLE: MOTHER BOARD (A18) P.C. BOARD ASSEMBLY

CALICO — CALIFORNIA INSTRUMENTS CORP SAN DIEGO, CALIFORNIA

CONTRACT NO — CODE IDENT 16067

MODEL 8303

RELEASE

CHECKER — PURCHASING

DESIGN — PROJ ENGR

DRFTSMN — CHF ENGR

DWG NO D8300-722 REV D

SCALE 1/1 SHEET 2 OF 5

| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| -1 | 1 | 8300-404 | | |

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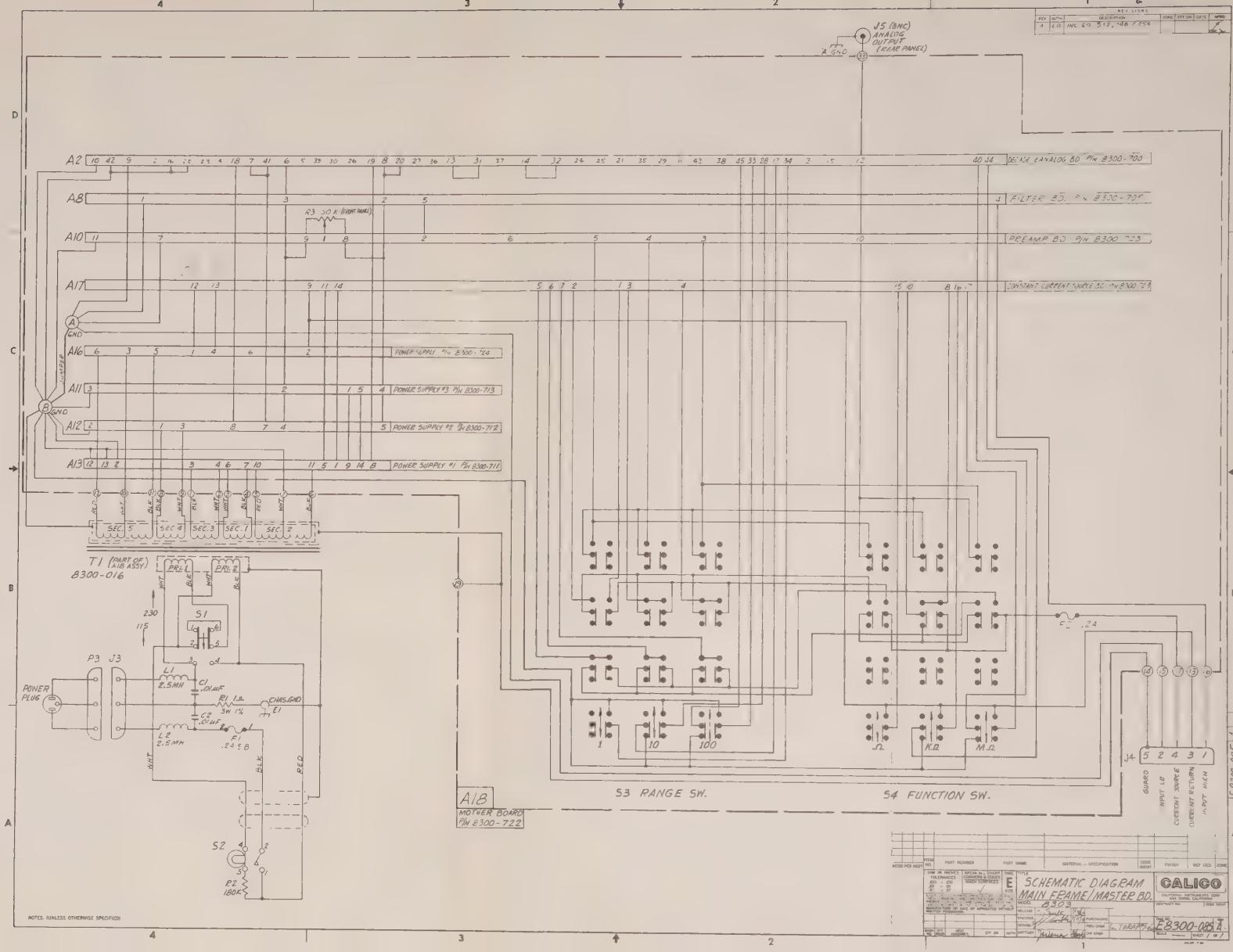
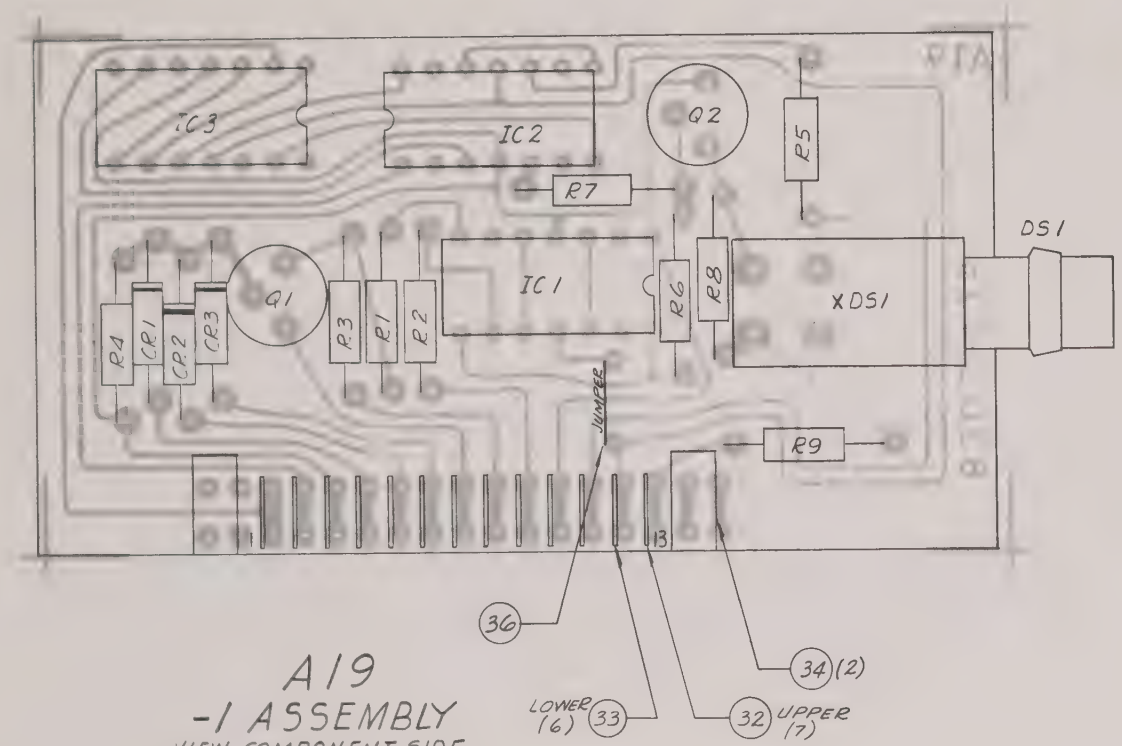
D8300-722 D


J5 (BNC) ANALOG OUTPUT (REAR PANEL)
A GND
A2
A8
A10
A17
A16
A11
A12
A13
R3 50 K (FRONT PANEL)
DECADE ANALOG BD P/N B300-700
FILTER BD. P/N B300-705
PREAMP BD P/N B300-703
CONSTANT CURRENT SOURCE BD P/N B300-713
POWER SUPPLY P/N B300-724
POWER SUPPLY #3 P/N B300-713
POWER SUPPLY #2 P/N B300-712
POWER SUPPLY #1 P/N B300-711
SEC. 5
SEC. 4
SEC. 3
SEC. 1
SEC. 2
T1 (PART OF) A18 A551) B300-016
PRI. 1
PRI. 2
230
115
S1
P3
J3
POWER PLUG
L1 2.5MH
C1 .01 MF
R1 1 Ω 3W 1%
CHASS GND
E1
C2 .01 MF
L2 2.5MH
F1 .2 A SB
S2
R2 180K
S3 RANGE SW.
S4 FUNCTION SW.
1
10
100
Ω
KΩ
MΩ
.2A
J4
5 2 4 3 1
GUARD
INPUT LO
CURRENT SOURCE
CURRENT RETURN
INPUT HIGH
A18
MOTHER BOARD P/N B300-722
NOTES: UNLESS OTHERWISE SPECIFIED
REVISIONS
REV
DESCRIPTION
A
E.O. INC E.O. 512, 548 & 554
SCHEMATIC DIAGRAM MAIN FRAME/MASTER BD.
CALICO
B303
E8300-085 A
SHEET 1 OF 1

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
| | | | | | | |




# A19
## -1 ASSEMBLY
VIEW COMPONENT SIDE

1. FOR SCHEMATIC SEE DWG. NO. C8300-088

NOTES (UNLESS OTHERWISE SPECIFIED)

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

DIM IN INCHES TOLERANCES .XXX = .010 .XX = .03 X° = 30'

BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓

DWG SIZE C

EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION.

TITLE: OVERLOAD A19 P.C. BOARD ASSEMBLY

MODEL 8300 & 8303

| | | | |
|---|---|---|---|
| RELEASE | E. Hurst | 11/5/69 | PURCHASING |
| CHECKER | Monte | 6/11/69 | |
| DESIGN | | | PROJ ENGR |
| DRFTSMN | Wiener | 6/11/69 | CHF ENGR |

CALICO
CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

CONTRACT NO. | CODE IDENT 16067

DWG NO. C8300-725 | REV \

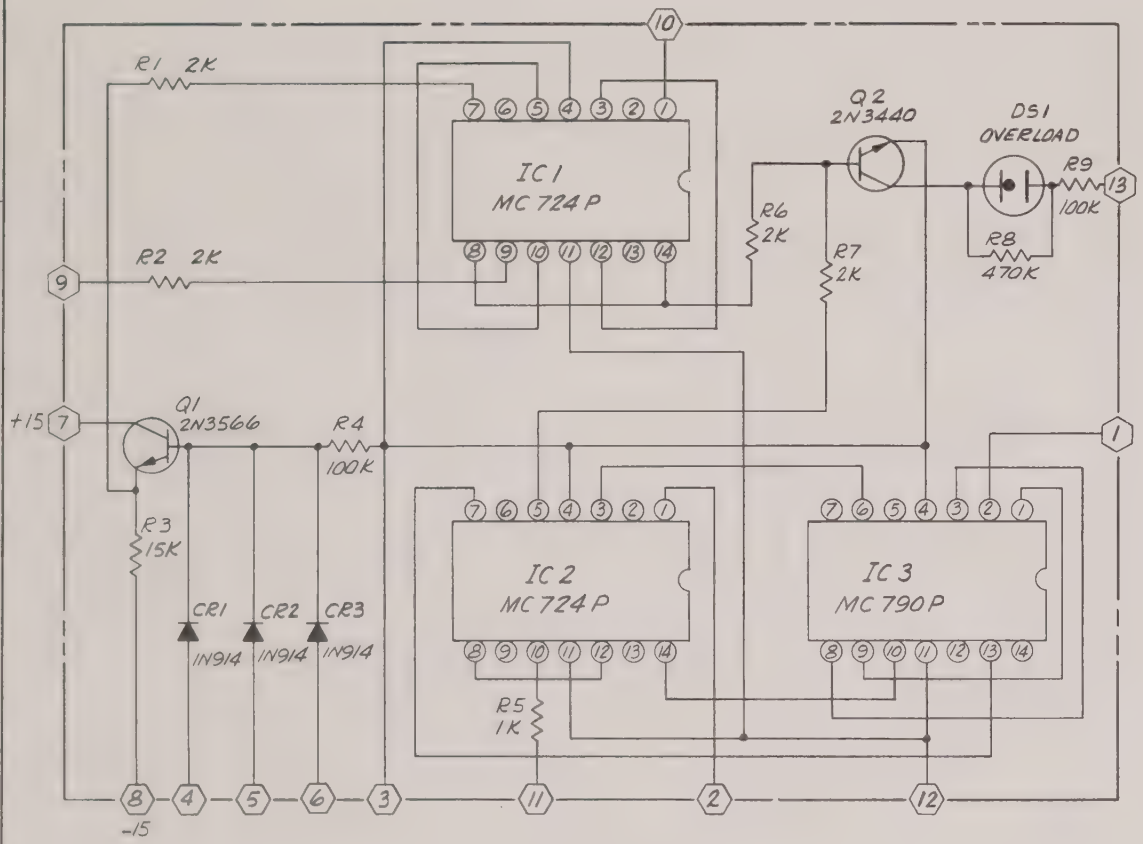
SCALE 4/1 | SHEET 2 OF 4

CALICO F-102

| DASH NO. | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

C8300-725 \

A19




2. FOR P.C. BOARD ASSY SEE DWG. No. 8300-725

1. ALL RESISTORS ARE 1/4 W 5%

NOTES: (UNLESS OTHERWISE SPECIFIED)

REVISIONS

| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APRD |
|---|---|---|---|---|---|---|
| | | | | | | |

| REQD PER ASSY | ITEM NO. | PART NUMBER | PART NAME | MATERIAL — SPECIFICATION | CODE IDENT | FINISH | REF DES. | ZONE |
|---|---|---|---|---|---|---|---|---|

DIM IN INCHES TOLERANCES .XXX = .010 .XX = .03 X° = 30'

BREAK ALL SHARP CORNERS & EDGES MACH SURFACES ✓

DWG SIZE C

EXCEPT AS OTHERWISE PROVIDED BY CONTRACT, THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CALICO AND SHALL NOT BE REPRODUCED OR COPIED OR USED AS THE BASIS FOR THE MANUFACTURE OR SALE OF APPARATUS WITHOUT WRITTEN PERMISSION

TITLE: SCHEMATIC - OVERLOAD (A19)

MODEL: 8300 & 8303

RELEASE

CHECKER

DESIGN

DRFTSMN: Wenn 6/16

PURCHASING

PROJ ENGR: G. THRAP 9-1-66

CHF ENGR

CALICO — CALIFORNIA INSTRUMENTS CORP SAN DIEGO, CALIFORNIA

CONTRACT NO

CODE IDENT 16067

DWG NO. C8300-088 REV /

SCALE —— SHEET / OF /

| DASH NO | QTY REQD | NEXT ASSEMBLY | EFF ON | AUTH |
|---|---|---|---|---|
| | | | | |

CALICO F-102

C8300-088

## REPLACEABLE PARTS

### 7.1 GENERAL

This section contains ordering information and complete list of replaceable parts. (Applicable part lists to the appendix section are contained therein, not in this section.) Parts are listed by major assembly in alphanumeric order of their reference designators. Description, manufacturers' part number, manufacturers' code ident number (see Appendix A for list of manufacturers), and CALICO's stock number are indicated.

### 7.2 ORDERING INFORMATION

In order to provide our customers with prompt service on replacement parts, please provide the following information, when applicable, for each part ordered.

a) Model number and serial number of the instrument

b) CALICO part number of the sub-assembly where component is located

c) Component reference designator

d) Component description

e) Component manufacturer number and code ident

f) CALICO stock number

All replacement parts orders should be placed with CALIFORNIA INSTRUMENTS CORPORATION, San Diego, California.

CALICO | CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | **PARTS LIST**

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| | 8300-404 | DIGITAL OHMMETER | 16067 | | 1 |
| | 8300-405-1 | MODEL 8303 Accessory Kit | 16067 | 1-42071 | 2 |
| | 8300-402-2 | RACK MTG. ASSY | 16067 | | 3 |
| | 8300-401-2 | BEZEL ASSY (8303) | 16067 | | 4 |
| | | | | | 5 |
| | | | | | 6 |
| | | | | | 7 |
| | 8300-202-1 | SIDE PANEL | 16067 | 1-42030 | 8 |
| | 8300-202-2 | SIDE PANEL | 16067 | 1-42031 | 9 |
| | 8300-203-7 | FRONT SUB PANEL | 16067 | 1-42036 | 10 |
| | 8300-205-7 | REAR PANEL | 16067 | 1-42035 | 11 |
| | 8300-206-7 | TOP COVER | 16067 | 1-42033 | 12 |
| | 8300-206-8 | BOTTOM COVER | 16067 | 1-42034 | 13 |
| | 8300-208-7 | SHIELD TRANSFORMER | 16067 | 1-42037 | 14 |
| | 8300-215-7 | BUTCH PLATE | 16067 | 1-42040 | 15 |
| | 8300-231-7 | POLARIZER | 16067 | 1-42065 | 16 |
| | 8300-236-7 | BUTCH PLATE | 16067 | 1-42070 | 17 |
| | | | | | 18 |
| | | | | | 19 |
| | | | | | 20 |
| | 8300-715-7 | GUARD SHIELD COVER BOT. | 16067 | 1-55049 | 21 |
| | 8300-716-7 | GUARD SHIELD R.S. | 16067 | 1-55050 | 22 |
| | 8300-717-7 | GUARD SHIELD L.S. | 16067 | 1-55051 | 23 |
| | 8300-718-7 | GUARD SHIELD COVER TOP | 16067 | 1-55052 | 24 |
| | 8300-719-7 | GUARD SHIELD XFORMER | 16067 | 1-55053 | 25 |
| | 8300-720-7 | GUARD SHIELD XFROMER | 16067 | 1-55054 | 26 |
| | | | | | 27 |
| | | | | | 28 |
| | | | | | 29 |
| A1 | | NOT USED | | | 30 |
| A2 | 8300-700-2 | DECADE and ANALOG BD. | 16067 | | 31 |
| A3 THRU A7 | | NOT USED | | | 32 |
| A8 | 8300-705-1 | FILTER BOARD | 16067 | | 33 |
| A9 | | NOT USED | | | 34 |
| A10 | 8300-703-1 | PRE-AMP BOARD | 16067 | | 35 |
| A11 | 8300-713-1 | POWER SUPPLY #3 | 16067 | | 36 |

MODEL 8303 | CALICO P N 8300-404 | ASSY R.O.

TITLE DIGITAL OHMMETER | SHT 3 OF 5

CALICO | CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A12 | 8300-712-1 | POWER SUPPLY #2 | 16067 | | 37 |
| A13 | 8300-711-1 | POWER SUPPLY #1 | 16067 | | 38 |
| A14 | | NOT USED | | | 39 |
| A15 | 8300-710-1 | PRINT BOARD | 16067 | | 40 |
| A16 | 8300-724-1 | POWER SUPPLY BOARD | 16067 | | 41 |
| A17 | 8300-723-1 | CONSTANT CURRENT SOURCE BOARD | 16067 | | 42 |
| A18 | 8300-722-1 | MOTHER BOARD | 16067 | | 43 |
| A19 | 8300-725-1 | OVERRANGE BOARD | 16067 | | 44 |
| | | | | | 45 |
| | | | | | 46 |
| C1 | Z5U | CAPACITOR .01 μf | 56289 | 6-10086 | 47 |
| C2 | Z5U | CAPACITOR .01 μf | 56289 | 6-10086 | 48 |
| | | | | | 49 |
| | | | | | 50 |
| | | | | | 51 |
| F1 | 313.200 | FUSE .2A S.B. | 75915 | 2-40310 | 52 |
| F2 | AGC | FUSE .2A Fast Blo | 71400 | 2-70013 | 53 |
| | | | | | 54 |
| | | | | | 55 |
| | | | | | 56 |
| J1 | | NOT USED | | | 57 |
| J2 | | NOT USED | | | 58 |
| J3 | AC3 | RECEPTACLE PWR. CORD | 82389 | 4-10111 | 59 |
| J4 | 60GA4F | RECEPTACLE | 82389 | 4-10108 | 60 |
| J5 | 28JR106-1 | BNC CONNECTOR | 24931 | 4-10091 | 61 |
| | | | | | 62 |
| | | | | | 63 |
| L1 | 6302 | CHOKE 2.5 Mh | 76493 | 5-90001 | 64 |
| L2 | 6302 | CHOKE 2.5 Mh | 76493 | 5-90001 | 65 |
| | | | | | 66 |
| | | | | | 67 |
| | | | | | 68 |
| R1 | 4330 | RESISTOR 1Ω 3 1/4W | 91637 | 5-50002 | 69 |
| R2 | RC07GF184J | RESISTOR 180K 1/4W 5% | JEDEC | 5-10106 | 70 |
| | | | | | 71 |
| | | | | | 72 |

MODEL 8303 | CALICO P/N 8300-404 | ASSY R.O.

TITLE DIGITAL OHMMETER | SHT 4 OF 5

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| S1 | 46206LF | POWER MODE SWITCH | 82389 | 2-40298 | 73 |
| S2 | 54-61681-26A1H | POWER SWITCH | 87034 | 2-40126 | 74 |
| | | | | | 75 |
| | | | | | 76 |
| XF1 | 342004 | FUSE HOLDER | 75915 | 2-40264 | 77 |
| | | | | | 78 |
| | | | | | 79 |
| | | | | | 80 |
| | J52306 | PUSH BUTTON | 71590 | 2-40292 | 81 |
| | 129515 | ANGLE BRACKET | 73734 | 1-10167 | 82 |
| | 1416-4 | TERMINAL LUG | 83330 | 2-50094 | 83 |
| | 608 | HOLE PLUG | 83330 | 2-10137 | 84 |
| | 2161 | #4 FIBRE WASHER | 83330 | 2-10087 | 85 |
| | | | | | 86 |
| | N440-5/16 | NYLON SCREW, FLAT HD. | 75987 | 2-10135 | 87 |
| | N440-X | NYLON NUT | 75987 | 2-10136 | 88 |
| | | | | | 89 |
| | | | | | 90 |
| | | | | | 91 |
| | 4-40 1/4 LG. | SCREW, PAN HEAD | | | 92 |
| | 6-32 3/4 LG. | SCREW, PAN HEAD | | | 93 |
| | 4-40 1/4 LG. | SCREW, FLAT HEAD | | | 94 |
| | 6-32 3/4 LG. | SCREW, FLAT HEAD | | | 95 |
| | | | | | 96 |
| | | | | | 97 |
| | #4 | WASHER, INT. STAR | | | 98 |
| | #6 | WASHER, INT. STAR | | | 99 |
| | | | | | 100 |
| | | | | | 101 |
| | #4-40 | NUT | | | 102 |
| | #6-32 | NUT | | | 103 |
| | | | | | 104 |
| | (Must be purchased in 10 ft. long = Approximately 333 Pcs.) | | | | 105 |
| | 24 AWG | BUSS WIRE | | | 106 |
| | | TEFLON SLEEVING FOR 24 AWG WIRE | | | 107 |
| | | | | | 108 |

MODEL 8303 — CALICO P/N 8300-404 — ASSY R.O.

TITLE DIGITAL OHMMETER — SHT 5 OF 5

CALICO CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| | 8300-405 | Model 8300 Accessory Kit | 16067 | | 1 |
| | (Following items to be bagged and shipped with unit) | | | | 2 |
| | | | | | 3 |
| | | | | | 4 |
| | | | | | 5 |
| | 17258S | Power Cord | 70903 | 2-41094 | 6 |
| | 8300-801-1 | Input Cable Assy | 16067 | 1-42074 | 7 |
| | | | | | 8 |
| | | | | | 9 |
| | 313.100 | Fuse .1A S.B. | 75915 | 2-40316 | 10 |
| | | | | | 11 |
| | | | | | 12 |
| | | | | | 13 |
| | 5000 | Alignment Tool | 00194 | 2-41098 | 14 |
| | | | | | 15 |
| | | | | | 16 |
| | | | | | 17 |
| | Model 8303 | Instruction Manual | 16067 | | 18 |

MODEL 8303 | CALICO P/N 8300-405 | A | ASSY R.O.

TITLE MODEL 8303 ACCESSORY KIT | SHT 2 OF 2

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A2 | 8300-700 -1 | ANALOG + DECADE BOARD | 16067 | For 8300 | 1 |
| | -7 | P.C. BOARD | 16067 | 1-55035 | 2 |
| | -2 | ANALOG + DECADE BOARD | | For 8303 | 3 |
| | | | | | 4 |
| A2C1 | CIC-101 | CAPACITOR .047 µf | 16067 | 6-10491 | 5 |
| A2C2 | CK-502 | CAPACITOR .005µf | 71590 | 6-10078 | 6 |
| A2C3 | DD201 | CAPACITOR 200pf | 71590 | 6-10461 | 7 |
| A2C4 | TE-1207 | CAPACITOR 25µf 25V | 04062 | 6-10355 | 8 |
| A2C5 | TE-1129 | CAPACITOR 15µf 12V | 56289 | 6-10683 | 9 |
| A2C6 | CMO5C050K03 | CAPACITOR 5pf | 04062 | 6-10483 | 10 |
| A2C7 | 5C023105X0250B3 | CAPACITOR 1µf | 56289 | 6-10440 | 11 |
| A2C8 | CK-102 | CAPACITOR .001µf | 71590 | 6-10459 | 12 |
| A2C9 | CK-503 | CAPACITOR .05µf | 71590 | 6-10460 | 13 |
| A2C10 | TE-1207 | CAPACITOR 25µf 25V | 04062 | 6-10355 | 14 |
| A2C11 | DM-15-471F | CAPACITOR 470 pf | 04062 | 6-10519 | 15 |
| A2CR1 | CIC-704 | DIODE ZENER | 16067 | 3-10142 | 16 |
| A2CR2 | IN914 | DIODE | JEDEC | 3-10118 | 17 |
| A2CR3 | IN5227 | DIODE ZENER | 04713 | 3-10136 | 18 |
| A2CR4 | IN914 | DIODE | JEDEC | 3-10118 | 19 |
| A2CR5 | IN914 | DIODE | JEDEC | 3-10118 | 20 |
| A2CR6 | IN914 | DIODE | JEDEC | 3-10118 | 21 |
| A2CR7 | IN914 | DIODE | JEDEC | 3-10118 | 22 |
| A2CR8 | IN914 | DIODE | JEDEC | 3-10118 | 23 |
| A2CR9 | IN914 | DIODE | JEDEC | 3-10118 | 24 |
| A2CR10 | IN914 | DIODE | JEDEC | 3-10118 | 25 |
| A2DS1 | B5750 | NIXIE TUBE | 83594 | 2-30031 | 26 |
| A2DS2 | B5750 | NIXIE TUBE | 83594 | 2-30031 | 27 |
| A2DS3 | B5750 | NIXIE TUBE | 83594 | 2-30031 | 28 |
| A2DS4 | B5750 | NIXIE TUBE | 83594 | 2-30031 | 29 |
| A2DS5 | B5750 | NIXIE TUBE | 83594 | 2-30031 | 30 |
| A2DS6 | B5856 | NIXIE TUBE POL. | 83594 | 2-30036 | 31 |
| | | | | | 32 |
| A2IC1 | CIC-200-4 | I. C. | 16067 | 3-30007 | 33 |
| A2IC2 | 811CE | I. C. | 0000B | 3-30128 | 34 |
| A2IC3 | 811CE | I. C. | 0000B | 3-30128 | 35 |
| A2IC4 | MC789P | I. C. | 04713 | 3-30112 | 36 |

MODEL 8300 — CALICO P N 8300-700 — E — ASSY R.O. A2

TITLE ANALOG + DECADE BOARD ASSY — SHT 4 OF 7

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A2IC5 | MC724P | I. C. | 04713 | 3-30111 | 37 |
| A2IC6 | MC724P | I. C. | 04713 | 3-30111 | 38 |
| A2IC7 | MC724P | I. C. | 04713 | 3-30111 | 39 |
| A2IC8 | U6B996079X | I. C. | 07263 | 3-30116 | 40 |
| A2IC9 | U6A995979X | I. C. | 07263 | 3-30115 | 41 |
| A2IC10 | U5B995879X | I. C. | 07263 | 3-30114 | 42 |
| A2IC11 | U5B995879X | I. C. | 07263 | 3-30114 | 43 |
| A2IC12 | U6B996079X | I. C. | 07263 | 3-30116 | 44 |
| A2IC13 | U6A995979X | I. C. | 07263 | 3-30115 | 45 |
| A2IC14 | U5B995879X | I. C. | 07263 | 3-30114 | 46 |
| A2IC15 | U6B996079X | I. C. | 07263 | 3-30116 | 47 |
| A2IC16 | U6A995979X | I. C. | 07263 | 3-30115 | 48 |
| A2IC17 | U5B995879X | I. C. | 07263 | 3-30114 | 49 |
| A2IC18 | U6B996079X | I. C. | 07263 | 3-30116 | 50 |
| A2IC19 | U6A995979X | I. C. | 07263 | 3-30115 | 51 |
| A2IC20 | U5B995879X | I. C. | 07263 | 3-30114 | 52 |
| A2IC21 | MC790P | I. C. | 04713 | 3-30113 | 53 |
| A2IC22 | MC789P | I. C. | 04713 | 3-30112 | 54 |
| | | | | | 55 |
| A2Q1 | 2N3638 | TRANSISTOR | 07263 | 3-30094 | 56 |
| A2Q2 | CIC 336 | TRANSISTOR | 16067 | 3-30015 | 57 |
| A2Q3 | TIS43 | UNIJUNCTION | 16067 | 3-30131 | 58 |
| A2Q4 | 2N3440 | TRANSISTOR | 07263 | 3-30090 | 59 |
| A2Q5 | 2N3440 | TRANSISTOR | 07263 | 3-30090 | 60 |
| A2Q6 | 2N3440 | TRANSISTOR | 07263 | 3-30090 | 61 |
| A2Q7 | 2N3440 | TRANSISTOR | 07263 | 3-30090 | 62 |
| | | | | | 63 |
| A2R1 | T.B.D. | RESISTOR 3300A-014 .05% | 16067 | | 64 |
| A2R2 | 3257W-1-502 | POT 5K | 80294 | 5-70081 | 65 |
| A2R3 | RC07GF101J | RESISTOR 100Ω 1/4W 5% | JEDEC | 5-10029 | 66 |
| A2R4 | RC07GF153J | RESISTOR 15K 1/4W 5% | JEDEC | 5-10080 | 67 |
| A2R5 | 3300A-014-42 | RESISTOR 599.7K .05% | 16067 | 5-80072 | 68 |
| A2R6 | T.B.D. | RESISTOR RN60D 1% | | | 69 |
| A2R7 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 70 |
| A2R8 | RC07GF106J | RESISTOR 10M 1/4W 5% | JEDEC | 5-10135 | 71 |
| A2R9 | RC07GF106J | RESISTOR 10M 1/4W 5% | JEDEC | 5-10135 | 72 |

MODEL 8300 — CALICO P/N 8300-700 — ASSY R.O. A2

TITLE ANALOG + DECADE BOARD ASSY — SHT 5 OF 7

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | **PARTS LIST**

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A2R10 | RC07GF275J | RESISTOR 2.7M 1/4W 5% | JEDEC | 5-10127 | 73 |
| A2R11 | 3255W-1-103 | POT 10K | 80294 | 5-70087 | 74 |
| A2R12 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 75 |
| A2R13 | RC07GF272J | RESISTOR 2.7K 1/4W 5% | JEDEC | 5-10062 | 76 |
| A2R14 | RC07GF101J | RESISTOR 100Ω 1/4W 5% | JEDEC | 5-10029 | 77 |
| A2R15 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 78 |
| A2R16 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 79 |
| A2R17 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 80 |
| A2R18 | T.B.D. | RESISTOR RC07GF | JEDEC | | 81 |
| A2R19 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 82 |
| A2R20 | RC07GF154J | RESISTOR 150K 1/4W 5% | JEDEC | 5-10104 | 83 |
| A2R21 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 84 |
| A2R22 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 85 |
| A2R23 | 3255W-1-103 | POT 10K | 80294 | 5-70087 | 86 |
| A2R24 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 87 |
| A2R25 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 88 |
| A2R26 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 89 |
| A2R27 | RC07GF104J | RESISTOR 100K 1/4W 5% | JEDEC | 5-10100 | 90 |
| A2R28 | RC07GF104J | RESISTOR 100K 1/4W 5% | JEDEC | 5-10100 | 91 |
| A2R29 | RC07GF183J | RESISTOR 18K 1/4W 5% | JEDEC | 5-10082 | 92 |
| A2R30 | RC07GF183J | RESISTOR 18K 1/4W 5% | JEDEC | 5-10082 | 93 |
| A2R31 | RC07GF183J | RESISTOR 18K 1/4W 5% | JEDEC | 5-10082 | 94 |
| A2R32 | RC07GF183J | RESISTOR 18K 1/4W 5% | JEDEC | 5-10082 | 95 |
| A2R33 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 96 |
| A2R34 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 97 |
| A2R35 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 98 |
| A2R36 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 99 |
| A2R37 | RC07GF183J | RESISTOR 18K 1/4W 5% | JEDEC | 5-10082 | 100 |
| A2R38 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 101 |
| A2R39 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 102 |
| A2R40 | RC07GF183J | RESISTOR 18K 1/4W 5% | JEDEC | 5-10082 | 103 |
| A2R41 | T.B.D. | RESISTOR RN60D | | | 104 |
| A2R42 | RC07GF100J | RESISTOR 10Ω 1/4W 5% | JEDEC | 5-10005 | 105 |
| A2R43 | RC07GF432J | RESISTOR 4.3K 1/4W 5% | JEDEC | 5-10067 | 106 |
| | | | | | 107 |
| A2Y1 | CR-18A/L | CRYSTAL 2 MHz | 13454 | 3-30124 | 108 |

MODEL 8300 | CALICO P/N 8300-700 | B | ASSY R.O. A2

TITLE ANALOG + DECADE BOARD ASSY | SHT 6 OF 7

CALICO | CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| | 24 AWG | BUSS WIRE | | | 109 |
| | | TEFLON SLEEVING FOR #24 WIRE | | | 110 |
| | | | | | 111 |
| | RCTO5075-7A | TRANS. PAD | 19080 | 2-40296 | 112 |
| | | | | | 113 |
| | 02-037-701-9-200-009 | ELCO PIN | 91662 | 2-40304 | 114 |
| | 02-013-701-9-200-009 | ELCO PIN | 91662 | 2-40326 | 115 |
| | 62-5204-41-12 | ELCO GUIDE PIN | 91662 | 2-40301 | 116 |

| MODEL | CALICO P/N | ASSY R.O. |
|---|---|---|
| 8300 | 8300-700 | A2 |
| TITLE ANALOG + DECADE BOARD ASSY | SHT 7 OF 7 | |

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A8 | 8300-705 | FILTER BD. | 16067 | | 1 |
| | -7 | P.C. BD. | 16067 | 1-55039 | 2 |
| | SEE SHT. 3 | EYELET | | | 3 |
| | | | | | 4 |
| A8C1 | HS1A104 ±1/2% | CAPACITOR .1μf ±1/2% | 12406 | 6-10706 | 5 |
| A8C2 | HS1A104 ±1/2% | CAPACITOR .1μf ±1/2% | 12406 | 6-10706 | 6 |
| A8C3 | HS1A104 ±1/2% | CAPACITOR .1μf ±1/2% | 12406 | 6-10706 | 7 |
| A8C4 | CK 102 | CAPACITOR .001μf | 71590 | 6-10459 | 8 |
| | | | | | 9 |
| A8CR1 | FD300 | DIODE | 02335 | 3-10007 | 10 |
| A8CR2 | FD300 | DIODE | 02335 | 3-10007 | 11 |
| | | | | | 12 |
| A8Q1 | U-1899E | TRANSISTOR | 15818 | 3-30196 | 13 |
| A8Q2 | 2N3638 ** | TRANSISTOR | 15818 ONLY | 3-30094 | 14 |
| A8Q3 | 2N3566 | TRANSISTOR | 07263 | 3-30091 | 15 |
| | ** SELECT FOR LOW $\frac{1}{f}$ NOISE | | | | 16 |
| A8R1 | RC07GF473J | RESISTOR 47K 1/4W 5% | JEDEC | 5-10092 | 17 |
| A8R2 | 3300A-014-45 | RESISTOR 45.92K .1% | 16067 | 5-80089 | 18 |
| A8R3 | 3300A-014-45 | RESISTOR 45.92K .1% | 16067 | 5-80089 | 19 |
| A8R4 | RC07GF473J | RESISTOR 47K 1/4W 5% | JEDEC | 5-10092 | 20 |
| A8R5 | 2387-200Ω | POT 200Ω | 91637 | 5-70092 | 21 |
| A8R6 | RN60D3741F | RESISTOR 3.74K 1% | JEDEC | 5-60044 | 22 |
| A8R7 | T.B.D. | RESISTOR RC07GF | JEDEC | | 23 |
| A8R8 | RC07GF683J | RESISTOR 68K 1/4W 5% | JEDEC | 5-10096 | 24 |
| A8R9 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 25 |
| A8R10 | RC07GF391J | RESISTOR 390Ω 1/4W 5% | JEDEC | 5-10043 | 26 |
| A8R11 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 27 |
| A8R12 | RC07GF472J | RESISTOR 4.7K 1/4W 5% | JEDEC | 5-10068 | 28 |
| | 4-40 1/4 LG. | SCREW, PAN HD. | | | 29 |
| A8TP1 | 430-103 | TEST POINT BLK. | 83330 | 2-41088 | 30 |
| A8TP2 | 430-108 | TEST POINT BRN. | 83330 | 2-41089 | 31 |
| A8TP3 | 430-102 | TEST POINT RED | 83330 | 2-41085 | 32 |
| | #4 | WASHER, INT. STAR | | | 33 |
| | 60-5001-19-13 | ELCO PIN | 91662 | 2-40290 | 34 |
| | 4-40 | HEX NUT | | | 35 |
| | 8300-219-7 | SHIELD | 16067 | 1-42044 | 36 |

MODEL 8300 — CALICO P N 8300-705 D — ASSY R.O. A8

TITLE FILTER BD. ASSY — SHT 4 OF 4

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | **PARTS LIST**

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A10 | 8300-703 | PRE-AMP BOARD | 16067 | | 1 |
| | -7 | P.C. BOARD | 16067 | 1-55037 | 2 |
| | SEE SHT. 3 | STAND OFF | | | 3 |
| A10C1 | 192P-47392 | CAPACITOR .047 µf | 56289 | 6-10465 | 4 |
| A10C2 | AJAX TYPE PPW | CAPACITOR .0022 µf | AJAX | 6-10238 | 5 |
| A10C3 | CMO5F221J03 | CAPACITOR 220 pf | 04062 | 6-10036 | 6 |
| A10C4 | DM-15-471F | CAPACITOR 470 pf | 04062 | 6-10519 | 7 |
| A10C5 | CMO5E750J03 | CAPACITOR 75 pf | 04062 | 6-10020 | 8 |
| A10C6 | TE 1155 | CAPACITOR 10/15V | 56289 | 6-10335 | 9 |
| A10C7 | DM10-020 | CAPACITOR 2 pf | 04062 | 6-10001 | 10 |
| A10C8 | TE 1155 | CAPACITOR 10/15V | 56289 | 6-10335 | 11 |
| A10C9 | TE 1155 | CAPACITOR 10/15V | 56289 | 6-10335 | 12 |
| A10C10 | TE 1155 | CAPACITOR 10/15V | 56289 | 6-10335 | 13 |
| A10C11 | CK 103 | CAPACITOR .01 µf | 71590 | 6-10094 | 14 |
| A10C12 | IDP-1-333 | CAPACITOR .033 µf 5% | 04062 | 6-10512 | 15 |
| A10C13 | CMO5F201J03 | CAPACITOR 200 pf | 04062 | 6-10282 | 16 |
| A10C14 | CK502 | CAPACITOR .005 µf | 71590 | 6-10078 | 17 |
| A10C15 | CK502 | CAPACITOR .005 µf | 71590 | 6-10078 | 18 |
| A10C16 | 5C023105X0250B3 | CAPACITOR 1/25V | 56289 | 6-10440 | 19 |
| A10C17 | CMO5F201J03 | CAPACITOR 200 pf | 04062 | 6-10282 | 20 |
| A10C18 | TE 1209 | CAPACITOR 50/25V | 56289 | 6-10368 | 21 |
| A10C19 | TE 1209 | CAPACITOR 50/25V | 56289 | 6-10368 | 22 |
| A10C20 | IDP-1-203 | CAPACITOR .02 µf | 04062 | 6-10100 | 23 |
| A10C21 | VX5A273J | CAPACITOR .027µf 50V 5% | 12406 | 6-10511 | 24 |
| A10C22 | CK 103 | CAPACITOR .01µf | 71590 | 6-10094 | 25 |
| A10C23 | CK502 | CAPACITOR .005 µf | 71590 | 6-10078 | 26 |
| A10CR1 | IN 5231A | DIODE ZENER | 04713 | 3-10143 | 27 |
| A10CR2 | IN 5234A | DIODE ZENER | 04713 | 3-10130 | 28 |
| A10CR3 | IN 914 | DIODE | JEDEC | 3-10118 | 29 |
| A10CR4 | IN 914 | DIODE | JEDEC | 3-10118 | 30 |
| A10CR5 | IN 914 | DIODE | JEDEC | 3-10118 | 31 |
| A10CR6 | IN 914 | DIODE | JEDEC | 3-10118 | 32 |
| A10CR7 | IN 914 | DIODE | JEDEC | 3-10118 | 33 |
| A10CR8 | IN 5234A | DIODE ZENER | 04713 | 3-10130 | 34 |
| A10CR9 | IN 5234A | DIODE ZENER | 04713 | 3-10130 | 35 |
| A10CR10 | IN 5234A | DIODE ZENER | 04713 | 3-10130 | 36 |

MODEL 8300 | CALICO P/N 8300-703 | ASSY R.O. A10

TITLE PRE-AMP BOARD, ASSY | SHT 4 OF 6

A

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A10IC1 | CIC-200-1 | INTEGRATED CKT. | 16067 | 3-30134 | 37 |
| A10IC2 | CIC-200-1 | INTEGRATED CKT. | 16067 | 3-30134 | 38 |
| A10IC3 | CIC-200-2 | INTEGRATED CKT. | 16067 | 3-30006 | 39 |
| | | | | | 40 |
| A10L1 | 1537-90 | CHOKE 200 μh | 76493 | 5-90005 | 41 |
| A10L2 | 1537-90 | CHOKE 200 μh | 76493 | 5-90005 | 42 |
| | | | | | 43 |
| A10Q1 | CIC-360 | TRANSISTOR | 16067 | 3-30129 | 44 |
| A10Q2 | 2N4351 | MOS F.E.T. | 04713 | 3-30127 | 45 |
| A10Q3 | 2N3566 | TRANSISTOR | 07263 | 3-30091 | 46 |
| A10Q4 | NOT BEING USED | TRANSISTOR | | | 47 |
| A10Q5 | 2N3566 | TRANSISTOR | 07263 | 3-30091 | 48 |
| A10Q6 | 2N1304 | TRANSISTOR | 01295 | 3-30117 | 49 |
| | | | | | 50 |
| A10R1 | RC07GF104J | RESISTOR 100K 1/4W 5% | JEDEC | 5-10100 | 51 |
| A10R2 | RC07GF105J | RESISTOR 1M 1/4W 5% | JEDEC | 5-10123 | 52 |
| A10R3 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 53 |
| A10R4 | RC07GF153J | RESISTOR 15K 1/4W 5% | JEDEC | 5-10080 | 54 |
| A10R5 | RC07GF821J | RESISTOR 820Ω 1/4W 5% | JEDEC | 5-10051 | 55 |
| A10R6 | RC07GF226J | RESISTOR 22M 1/4W 5% | JEDEC | 5-10139 | 56 |
| A10R7 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 57 |
| A10R8 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 58 |
| A10R9 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 59 |
| A10R10 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 60 |
| A10R11 | RC07GF101J | RESISTOR 100Ω 1/4W 5% | JEDEC | 5-10029 | 61 |
| A10R12 | RC07GF105J | RESISTOR 1M 1/4W 5% | JEDEC | 5-10123 | 62 |
| A10R13 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 63 |
| A10R14 | RC07GF153J | RESISTOR 15K 1/4W 5% | JEDEC | 5-10080 | 64 |
| A10R15 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 65 |
| A10R16 | RC07GF101J | RESISTOR 100Ω 1/4W 5% | JEDEC | 5-10029 | 66 |
| A10R17 | RC07GF104J | RESISTOR 100K 1/4W 5% | JEDEC | 5-10100 | 67 |
| A10R18 | 3300A-014-5 | RESISTOR 2K .01% | 16067 | 5-80012 | 68 |
| A10R19 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 69 |
| A10R20 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 70 |
| A10R21 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 71 |
| A10R22 | RN60D4221F | RESISTOR 4.22K 1% | JEDEC | 5-60048 | 72 |

MODEL 8300 — CALICO P/N 8300-703 — ASSY R.O. A10

TITLE PRE-AMP BD. ASSY — SHT 5 OF 6

B

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A10R23 | RC07GF334J | RESISTOR 330K 1/4W 5% | JEDEC | 5-10112 | 73 |
| A10R24 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 74 |
| A10R25 | RC07GF226J | RESISTOR 22M 1/4W 5% | JEDEC | 5-10139 | 75 |
| A10R26 | RN60D1002F | RESISTOR 10K 1% | JEDEC | 5-60079 | 76 |
| A10R27 | RN60D2001F | RESISTOR 2K 1% | JEDEC | 5-60029 | 77 |
| A10R28 | RN60D1002F | RESISTOR 10K 1% | JEDEC | 5-60079 | 78 |
| A10R29 | RC07GF125J | RESISTOR 1.2M 1/4W 5% | JEDEC | 5-10142 | 79 |
| A10R30 | 3300A-014-43 | RESISTOR 17.975 K .05% | 16067 | 5-80073 | 80 |
| A10R31 | 3300A-014-44 | RESISTOR 197.75 K .05% | 16067 | 5-80074 | 81 |
| A10R32 | ET34X500 | POT 50Ω | 30983 | 5-70129 | 82 |
| A10R33 | ET34X501 | POT 500Ω | 30983 | 5-70134 | 83 |
| A10R34 | RC07GF100J | RESISTOR 10Ω 1/4W 5% | JEDEC | 5-10005 | 84 |
| A10TP1 | 430-103 | TEST POINT--BLK. | 83330 | 2-41088 | 85 |
| A10TP2 | 430-108 | TEST POINT--BRN. | 83330 | 2-41089 | 86 |
| A10TP3 | 430-102 | TEST POINT--RED | 83330 | 2-41085 | 87 |
| A10TP4 | 430-106 | TEST POINT--ORN. | 83330 | 2-41086 | 88 |
| A10TP5 | 430-107 | TEST POINT--YEL. | 83330 | 2-41087 | 89 |
| A10TP6 | 430-104 | TEST POINT--GRN. | 83330 | 2-41090 | 90 |
| | | | | | 91 |
| | 60-5001-19-13 | ELCO PIN | 91662 | 2-40290 | 92 |
| | 8300-214-1 | SHIELD | 16067 | 1-42043 | 93 |
| | 8300-216-7 | CAN | 16067 | 1-42042 | 94 |
| | RCTO5075-7A | TRANS. PAD | 19080 | 2-40296 | 95 |
| | | | | | 96 |
| | 6-32 3/8 LG. | SCREW, NYLON RND HEAD | | 2-10145 | 97 |
| | 4-40 3/16 LG. | SCREW, PAN HEAD | | | 98 |
| | #4 | WASHER, INT. STAR | | | 99 |
| | | | | | 100 |
| | 4-40 3/16 Long | SCREW, NYLON PAN HEAD | | 2-10143 | 101 |
| | 4-40 | NUT, NYLON | | 2-10136 | 102 |
| | #4 | WASHER, NYLON, Flat | | 2-10142 | 103 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

MODEL 8300 — CALICO P/N 8300-703 D — ASSY R.O. A10

TITLE PRE-AMP BD. ASSY — SHT 6 OF 6

CALICO — CALIFORNIA INSTRUMENTS CORP., SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A11 | 8300-713 | POWER SUPPLY #13 | 16067 | | 1 |
| | -7 | P.C. BOARD | 16067 | 1-55047 | 2 |
| | | | | | 3 |
| | | | | | 4 |
| A11C1 | DD-201 | CAPACITOR 200 pf | 71590 | 6-10461 | 5 |
| A11C2 | DD-201 | CAPACITOR 200 pf | 71590 | 6-10461 | 6 |
| A11C3 | CK-502 | CAPACITOR .005 | 71590 | 6-10078 | 7 |
| A11C4 | CK-502 | CAPACITOR .005 | 71590 | 6-10078 | 8 |
| A11C5 | CK-103 | CAPACITOR .01 | 71590 | 6-10094 | 9 |
| A11C6 | CK-103 | CAPACITOR .01 | 71590 | 6-10094 | 10 |
| A11C7 | TE-1209 | CAPACITOR 50μf/25V | 56289 | 6-10368 | 11 |
| A11C8 | TE-1209 | CAPACITOR 50μf/25V | 56289 | 6-10368 | 12 |
| | | | | | 13 |
| A11CR1 | IN5227 | DIODE ZENER | 04713 | 3-10136 | 14 |
| A11CR2 | IN5227 | DIODE ZENER | 04713 | 3-10136 | 15 |
| A11CR3 | IN914 | DIODE | JEDEC | 3-10118 | 16 |
| A11CR4 | IN914 | DIODE | JEDEC | 3-10118 | 17 |
| A11CR5 | IN914 | DIODE | JEDEC | 3-10118 | 18 |
| A11CR6 | IN914 | DIODE | JEDEC | 3-10118 | 19 |
| A11CR7 | IN5234A | DIODE ZENER | 04713 | 3-10130 | 20 |
| A11CR8 | IN5234A | DIODE ZENER | 04713 | 3-10130 | 21 |
| A11CR9 | IN5234A | DIODE ZENER | 04713 | 3-10130 | 22 |
| A11CR10 | IN5234A | DIODE ZENER | 04713 | 3-10130 | 23 |
| A11CR11 | IN914 | DIODE | JEDEC | 3-10118 | 24 |
| A11CR12 | IN914 | DIODE | JEDEC | 3-10118 | 25 |
| A11CR13 | IN914 | DIODE | JEDEC | 3-10118 | 26 |
| A11CR14 | IN914 | DIODE | JEDEC | 3-10118 | 27 |
| | | | | | 28 |
| A11IC1 | CIC-200-1 | I.C. | 16067 | 3-30134 | 29 |
| A11IC2 | CIC-200-1 | I.C. | 16067 | 3-30134 | 30 |
| | | | | | 31 |
| A11Q1 | 2N3638 | TRANSISTOR | 07263 | 3-30094 | 32 |
| A11Q2 | 2N3566 | TRANSISTOR | 07263 | 3-30091 | 33 |
| A11Q3 | 2N2102 | TRANSISTOR | 95303 | 3-30075 | 34 |
| A11Q4 | 2N4036 | TRANSISTOR | 95303 | 3-30106 | 35 |
| | | | | | 36 |

| MODEL | 8300 | CALICO P/N | 8300-713 | ASSY R.O. |
|---|---|---|---|---|
| TITLE | POWER SUPPLY #3 BD. ASSY | SHT | 4 OF 5 | A11 |

CALICO | CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A11R1 | RC07GF751J | RESISTOR 750Ω 1/4W 5% | JEDEC | 5-10050 | 37 |
| A11R2 | RC07GF751J | RESISTOR 750Ω 1/4W 5% | JEDEC | 5-10050 | 38 |
| A11R3 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 39 |
| A11R4 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 40 |
| A11R5 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 41 |
| A11R6 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 42 |
| A11R7 | RC07GF221J | RESISTOR 220Ω 1/4W 5% | JEDEC | 5-10037 | 43 |
| A11R8 | RC07GF221J | RESISTOR 220Ω 1/4W 5% | JEDEC | 5-10037 | 44 |
| A11R9 | RC07GF47.1J | RESISTOR 4.7Ω 1/4W 5% | JEDEC | 5-10002 | 45 |
| A11R10 | RC07GF100J | RESISTOR 10Ω 1/4W 5% | JEDEC | 5-10005 | 46 |
| A11R11 | RC07GF302J | RESISTOR 3K 1/4W 5% | JEDEC | 5-10063 | 47 |
| A11R12 | RC07GF123J | RESISTOR 12K 1/4W 5% | JEDEC | 5-10078 | 48 |
| A11R13 | RC07GF123J | RESISTOR 12K 1/4W 5% | JEDEC | 5-10078 | 49 |
| A11R14 | RC07GF302J | RESISTOR 3K 1/4W 5% | JEDEC | 5-10063 | 50 |
| | | | | | 51 |
| | | | | | 52 |
| | 60-5001-19-13 | ELCO PIN | 91662 | 2-40290 | 53 |
| | RCTO5075-7A | TRANSI PAD | 19080 | 2-40296 | 54 |
| | | | | | 55 |
| | TXBF-032-025B | HEATSINK | 98978 | 2-40120 | 56 |

MODEL 8300 | CALICO P/N 8300-713 | ASSY R.O. A11

TITLE POWER SUPPLY #3 BD. ASSY | SHT 5 OF 5

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A12 | 8300-712 | POWER SUPPLY #2 | 16067 | | 1 |
| | -7 | P.C. BOARD | 16067 | 1-55046 | 2 |
| | [illegible] 3 | [illegible] | | | 3 |
| | | | | | 4 |
| A12C1 | BR-2000-15 | CAPACITOR 2000μf 15V | 14655 | 6-10403 | 5 |
| A12C2 | BR-2000-15 | CAPACITOR 2000μf 15V | 14655 | 6-10403 | 6 |
| A12C3 | DD-201 | CAPACITOR 200 pf | 71590 | 6-10461 | 7 |
| A12C4 | CK-502 | CAPACITOR .005μf | 71590 | 6-10078 | 8 |
| | | | | | 9 |
| | | | | | 10 |
| A12CR1 | SCE-2 | DIODE | 14099 | 3-10079 | 11 |
| A12CR2 | SCE-2 | DIODE | 14099 | 3-10079 | 12 |
| A12CR3 | SCE-2 | DIODE | 14099 | 3-10079 | 13 |
| A12CR4 | SCE-2 | DIODE | 14099 | 3-10079 | 14 |
| A12CR5 | IN914 | DIODE | JEDEC | 3-10118 | 15 |
| A12CR6 | IN914 | DIODE | JEDEC | 3-10118 | 16 |
| A12CR7 | IN914 | DIODE | JEDEC | 3-10118 | 17 |
| | | | | | 18 |
| | | | | | 19 |
| A12IC1 | CIC-200-1 | I.C. | 16067 | 3-30134 | 20 |
| | | | | | 21 |
| | | | | | 22 |
| A12Q1 | 2N2102 | TRANSISTOR | 95303 | 3-30075 | 23 |
| A12Q2 | 2N3767 | TRANSISTOR | 04713 | 3-30103 | 24 |
| | #20 | TEFLON SLEEVING | | | 25 |
| | 4-40 | NUT, HEX | | | 26 |
| A12R1 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 27 |
| A12R2 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 28 |
| A12R3 | RN60D1502F | RESISTOR 15K 1% | JEDEC | 5-60193 | 29 |
| A12R4 | RS-2B | RESISTOR .5Ω | 91637 | 5-50010 | 30 |
| A12R5 | RN60D3651F | RESISTOR 3.65K 1% | JEDEC | 5-60191 | 31 |
| | 2340 | SPACER | 83330 | 2-10026 | 32 |
| | 4-40 5/8 LG. | SCREW, R. H. | | | 33 |
| | 60-5001-19-13 | ELCO PIN | 91662 | 2-40290 | 34 |
| | #4 | WASHER INT. STAR | | | 35 |
| | | | | | 36 |

MODEL 8300 | CALICO P N 8300-712 | ASSY R.O. A12

TITLE POWER SUPPLY #2 BD. ASSY | SHT 4 OF 4

CALICO — CALIFORNIA INSTRUMENTS CORP., SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A13 | 8300-711 | POWER SUPPLY #1 | 16067 | | 1 |
| | -7 | P.C. BOARD | 16067 | 1-55045 | 2 |
| | | | | | 3 |
| | | | | | 4 |
| A13C1 | - - - - - - - - - | NOT USED - - - - - - - - - | | | 5 |
| A13C2 | BR250-50 | CAPACITOR 250μf/50V | 14655 | 6-10395 | 6 |
| A13C3 | BR250-50 | CAPACITOR 250μf/50V | 14655 | 6-10395 | 7 |
| A13C4 | TE-1305 | CAPACITOR 20μf/50V | 56289 | 6-10348 | 8 |
| | | | | | 9 |
| | | | | | 10 |
| A13CR1 | SCE-6 | DIODE | 14099 | 3-10078 | 11 |
| A13CR2 | SCE-6 | DIODE | 14099 | 3-10078 | 12 |
| A13CR3 | SCE-6 | DIODE | 14099 | 3-10078 | 13 |
| A13CR4 | SCE-6 | DIODE | 14099 | 3-10078 | 14 |
| A13CR5 | SCE-2 | DIODE | 14099 | 3-10079 | 15 |
| A13CR6 | SCE-2 | DIODE | 14099 | 3-10079 | 16 |
| A13CR7 | SCE-2 | DIODE | 14099 | 3-10079 | 17 |
| A13CR8 | SCE-2 | DIODE | 14099 | 3-10079 | 18 |
| A13CR9 | SCE-2 | DIODE | 14099 | 3-10079 | 19 |
| A13CR10 | SCE-2 | DIODE | 14099 | 3-10079 | 20 |
| A13CR11 | SCE-2 | DIODE | 14099 | 3-10079 | 21 |
| A13CR12 | SCE-2 | DIODE | 14099 | 3-10079 | 22 |
| | | | | | 23 |
| | | | | | 24 |
| | | | | | 25 |
| | | | | | 26 |
| | | | | | 27 |
| | 60-5001-19-13 | ELCO PIN | 91662 | 2-40290 | 28 |

MODEL 8300 — CALICO P/N 8300-711 — ASSY R.O. A13

TITLE POWER SUPPLY #1 BD. ASSY — SHT 4 OF 4

CALICO CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A16 | 8300-724 | POWER SUPPLY BOARD | 16067 | | 1 |
| | -7 | P. C. BOARD | 16067 | 1-55060 | 2 |
| | SEE SHEET 3 | EYELETS | | | 3 |
| | | | | | 4 |
| A16C1 | BR250-50 | CAPACITOR 250μf 50V | 14655 | 6-10395 | 5 |
| A16C2 | BR1000-50 | CAPACITOR 1000μf 50V | 14655 | 6-10529 | 6 |
| | | | | | 7 |
| | | | | | 8 |
| A16CR1 | SCE-2 | DIODE | 14099 | 3-10079 | 9 |
| A16CR2 | SCE-2 | DIODE | 14099 | 3-10079 | 10 |
| A16CR3 | SCE-2 | DIODE | 14099 | 3-10079 | 11 |
| A16CR4 | SCE-2 | DIODE | 14099 | 3-10079 | 12 |
| | | | | | 13 |
| | | | | | 14 |
| | 60-5001-19-13 | ELCO PIN | 91662 | 2-40290 | 15 |

MODEL 8303 | CALICO P/N 8300-724 C | ASSY R.O. A16

TITLE POWER SUPPLY BOARD | SHT 4 OF 4

CALICO — CALIFORNIA INSTRUMENTS CORP., SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A17 | 8300-723 | CONSTANT CURRENT SOURCE | 16067 | | 1 |
| | -7 | P. C. BOARD | 16067 | 1-55059 | 2 |
| | | | | | 3 |
| | | | | | 4 |
| A17C1 | 192P10492 | CAPACITOR .1 | 56289 | 6-10132 | 5 |
| A17C2 | WMF 2S47 | CAPACITOR .047 | 14655 | 6-10228 | 6 |
| A17C3 | WMF 2S1 | CAPACITOR .01 | 14655 | 6-10091 | 7 |
| A17C4 | CK 502 | CAPACITOR .005 | 71590 | 6-10078 | 8 |
| A17C5 | CM05F221J03 | CAPACITOR 220 pf | 04062 | 6-10036 | 9 |
| A17C6 | CK 502 | CAPACITOR .005 | 71590 | 6-10078 | 10 |
| A17C7 | 192P10492 | CAPACITOR .1 | 56289 | 6-10132 | 11 |
| A17C8 | T360A105M035AS | CAPACITOR 1μF 35V | 05397 | 6-10796 | 12 |
| A17CR1 | FD 300 | DIODE | 02335 | 3-10007 | 13 |
| A17CR2 | FD 300 | DIODE | 02335 | 3-10007 | 14 |
| A17CR3 | IN 914 | DIODE | JEDEC | 3-10118 | 15 |
| A17CR4 | IN 914 | DIODE | JEDEC | 3-10118 | 16 |
| A17CR5 | IN 914 | DIODE | JEDEC | 3-10118 | 17 |
| A17CR6 | IN 5250 | DIODE ZENER | 04713 | 3-10134 | 18 |
| A17CR7 | IN 914 | DIODE | JEDEC | 3-10118 | 19 |
| A17CR8 | IN 5227 | DIODE ZENER | 04713 | 3-10136 | 20 |
| A17CR9 | IN 5240 | DIODE ZENER | 04713 | 3-10133 | 21 |
| A17CR10 | IN 914 | DIODE | JEDEC | 3-10118 | 22 |
| A17CR11 | IN 914 | DIODE | JEDEC | 3-10118 | 23 |
| A17CR12 | IN 914 | DIODE | JEDEC | 3-10118 | 24 |
| A17CR13 | IN 914 | DIODE | JEDEC | 3-10118 | 25 |
| A17CR14 | IN5252B | DIODE ZENER | 04713 | 3-10069 | 26 |
| A17CR15 | SCE-4 | DIODE | 14099 | 3-10084 | 27 |
| A17CR16 | CIC 702-5 | DIODE ZENER | 16067 | 3-10168 | 28 |
| A17CR17 | IN 5234A | DIODE ZENER | 04713 | 3-10130 | 29 |
| A17CR18 | IN 5227 | DIODE ZENER | 04713 | 3-10136 | 30 |
| A17CR19 | IN 914 | DIODE | JEDEC | 3-10118 | 31 |
| A17CR20 | IN 914 | DIODE | JEDEC | 3-10118 | 32 |
| A17IC1 | CIC-200-2 | I. C. | 16067 | 3-30006 | 33 |
| A17Q1 | CIC 336 | TRANSISTOR | 16067 | 3-30015 | 34 |
| A17Q2 | 2N 3711 | TRANSISTOR | 01295 | 3-30098 | 35 |
| A17Q3 | CIC 330 | TRANSISTOR | 16067 | 3-30008 | 36 |

MODEL 8303 — CALICO P N 8300-723 — E — ASSY NO

TITLE CONSTANT CURRENT SOURCE — SHT 4 OF 6 — A17

CALICO | CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A17Q4 | 2N3440 | TRANSISTOR | 95303 | 3-30090 | 37 |
| A17Q5 | MJ2252 | TRANSISTOR | 04713 | 3-30139 | 38 |
| A17Q6 | CIC 718 | TRANSISTOR | 16067 | 3-30041 | 39 |
| | | | | | 40 |
| A17R1 | RC07GF474J | RESISTOR 470K 1/4W 5% | JEDEC | 5-10115 | 41 |
| A17R2 | RC07GF105J | RESISTOR 1 M 1/4W 5% | JEDEC | 5-10123 | 42 |
| A17R3 | RC07GF472J | RESISTOR 4.7K 1/4W 5% | JEDEC | 5-10068 | 43 |
| A17R4 | RC07GF104J | RESISTOR 100K 1/4W 5% | JEDEC | 5-10100 | 44 |
| A17R5 | RC07GF105J | RESISTOR 1M 1/4W 5% | JEDEC | 5-10123 | 45 |
| A17R6 | RC07GF105J | RESISTOR 1M 1/4W 5% | JEDEC | 5-10123 | 46 |
| A17R7 | RN70D1504F | RESISTOR 1.5M 1% | JEDEC | 5-60180 | 47 |
| A17R8 | RC07GF153J | RESISTOR 15K 1/4W 5% | JEDEC | 5-10080 | 48 |
| A17R9 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 49 |
| A17R10 | RN60D4020F | RESISTOR 402Ω 1% | JEDEC | 5-60010 | 50 |
| A17R11 | RC07GF512J | RESISTOR 5.1K 1/4W 5% | JEDEC | 5-10069 | 51 |
| A17R12 | RC07GF512J | RESISTOR 5.1K 1/4W 5% | JEDEC | 5-10069 | 52 |
| A17R13 | RC20GF432J | RESISTOR 4.3K 1/2W 5% | JEDEC | 5-20049 | 53 |
| A17R14 | RC07GF102J | RESISTOR 1 K 1/4W 5% | JEDEC | 5-10053 | 54 |
| A17R15 | RC07GF152J | RESISTOR 1.5K 1/4W 5% | JEDEC | 5-10057 | 55 |
| A17R16 | 452E1535 | RESISTOR 15K 5W | 56289 | 5-50091 | 56 |
| A17R17 | RC07GF9R1J | RESISTOR 9.1Ω 1/4W 5% | JEDEC | 5-10157 | 57 |
| A17R18 | EP-29 | RESISTOR 603Ω .1% | 07088 | 5-80105 | 58 |
| A17R19 | EP-27 | RESISTOR 60Ω .01% | 07088 | 5-80106 | 59 |
| A17R20 | ET34X204 | POT 200K | 30983 | 5-70136 | 60 |
| A17R21 | RN60D7502F | RESISTOR 75K 1% | JEDEC | 5-60215 | 61 |
| A17R22 | RN60D5902F | RESISTOR 59K 1% | JEDEC | 5-60120 | 62 |
| A17R23 | ET34X201 | POT 200Ω | 30983 | 5-70137 | 63 |
| A17R24 | T.B.D. | RESISTOR RN60D 1% | | | 64 |
| A17R25 | T.B.D. | RESISTOR RN60D 1% | | | 65 |
| A17R26 | ET34X501 | POT 500Ω | 30983 | 5-70134 | 66 |
| A17R27 | EP-27 | RESISTOR 59.75K .1% | 07088 | 5-80107 | 67 |
| A17R28 | EP-27 | RESISTOR 5.975K .1% | 07088 | 5-80108 | 68 |
| A17R29 | ET34X500 | POT 50Ω | 30983 | 5-70129 | 69 |
| A17R30 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 70 |
| A17R31 | RN60D1501F | RESISTOR 1.5K 1% | JEDEC | 5-60216 | 71 |
| A17R32 | RN60D4990F | RESISTOR 499Ω | JEDEC | 5-60262 | 72 |

MODEL 8303 | CALICO P/N 8300-723 | E | ASSY R.O. A17

TITLE CONSTANT CURRENT SOURCE | SHT 5 OF 6

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A17R33 | ET34X104 | POT 100K | 30983 | 5-70138 | 73 |
| A17R34 | RN80C5954D | RESISTOR 5.95M .5% | JEDEC | 5-80109 | 74 |
| A17R35 | ET34X205 | POT 2M | 30983 | 5-70139 | 75 |
| A17R36 | RN30X5905F | RESISTOR 59M 1% | JEDEC | 5-60377 | 76 |
| A17R37 | EP-20 | RESISTOR 597.5K .1% | 07088 | 5-80111 | 77 |
| A17R38 | ET34X502 | POT 5K | 30983 | 5-70132 | 78 |
| A17R39 | RC07GF226J | RESISTOR 22M 1/4W 5% | JEDEC | 5-10139 | 79 |
| A17R40 | RC07GF244J | RESISTOR 240K 1/4W 5% | JEDEC | 5-10109 | 80 |
| A17R41 | RC07GF474J | RESISTOR 470K 1/4W 5% | JEDEC | 5-10115 | 81 |
| A17R42 | RC20GF104J | RESISTOR 100K 1/2W 5% | JEDEC | 5-20077 | 82 |
| A17R43 | RC07GF153J | RESISTOR 15K 1/4W 5% | JEDEC | 5-10080 | 83 |
| A17R44 | RC07GF512J | RESISTOR 5.1K 1/4W 5% | JEDEC | 5-10069 | 84 |
| A17R45 | RC07GF | RESISTOR T.B.D. 1/4W 5% | JEDEC | | 85 |
| | 1308B | TERMINAL | 88245 | 2-50096 | 86 |
| | | | | | 87 |
| | 4-40 3/8 LG. | SCREW, PAN HEAD | | | 88 |
| | #4 | WASHER, INT. STAR | | | 89 |
| | 4-40 | NUT | | | 90 |
| | | | | | 91 |
| | RCT05075-7A | TRANSISTOR PAD | 19080 | 2-40296 | 92 |
| | RCT018110-1A | TRANSISTOR PAD | 19080 | 2-40297 | 93 |
| | | | | | 94 |
| | LB66BIB | HEATSINK | 98978 | 2-41047 | 95 |
| | | | | | 96 |
| | 60-5001-19-13 | ELCO PIN | 91662 | 2-40290 | 97 |

MODEL 8303 — CALICO P N 8300-723 — D — ASSY R.O.

TITLE CONSTANT CURRENT SOURCE — SHT 6 OF 6 — A17

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A18 | 8300-722 | MOTHER BOARD ASSY | 16067 | | 1 |
| | -7 | P. C. BOARD | 16067 | 1-55058 | 2 |
| | | | | | 3 |
| | | | | | 4 |
| | | | | | 5 |
| A18R1 | | NOT USED | | | 6 |
| A18R2 | | NOT USED | | | 7 |
| A18R3 | ET34X503 | POT 50 K | 30983 | 5-70133 | 8 |
| | | | | | 9 |
| | | | | | 10 |
| | | | | | 11 |
| A18S1 | | NOT USED | | | 12 |
| A18S2 | | NOT USED | | | 13 |
| A18S3 | 8300-017 | SWITCH-PUSH BUTTON | 16067 | 2-40324 | 14 |
| A18S4 | 8300-017 | SWITCH-PUSH BUTTON | 16067 | 2-40324 | 15 |
| | | | | | 16 |
| | | | | | 17 |
| | | | | | 18 |
| A18T1 | 8300-016 | TRANSFORMER | 16067 | 7-10126 | 19 |
| | | | | | 20 |
| | | | | | 21 |
| | | | | | 22 |
| | 8300-237-7 | MOTHER BD. STIFFENER | 16067 | 1-42076 | 23 |
| | 8300-221-7 | SHIELD | 16067 | 1-42038 | 24 |
| | | | | | 25 |
| | | | | | 26 |
| | | | | | 27 |
| | | | | | 28 |
| | 352 | HINGED STAND OFF | 91833 | 2-40313 | 29 |
| | 9725-A-0440 | STAND OFF 5/16 LG. x 4-40 | 06540 | 2-40311 | 30 |
| | 8083-A-0440 | STAND OFF 5/8 LG. x 4-40 | 06540 | 2-40312 | 31 |
| | 62-5201-02-23 | ELCO PIN | 91662 | 2-40300 | 32 |
| | 62-5201-40-12 | BD. GUIDE, RIGHT | 91662 | 2-40302 | 33 |
| | 62-5201-40-22 | BD. GUIDE, LEFT | 91662 | 2-40303 | 34 |
| | 2073 | RUBBER BUMPER | 76348 | 2-10138 | 35 |
| | .200FSI.12A15 | FLEX STRIP | 15912 | 2-41096 | 36 |

| | | | |
|---|---|---|---|
| MODEL 8303 | CALICO P N 8300-722 | | ASSY R.O. A18 |
| TITLE MOTHER BOARD ASSEMBLY | | SHT 4 OF 5 | |

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA

CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| | 5681-15 | FUSE CLIP | 71400 | 2-40291 | 37 |
| | 97438 | FINGER STRIP 3/8 WIDE | 30817 | 2-50095 | 38 |
| | (Must be purchased in 10 ft. long = Approximately 333 Pcs.) | | | | 39 |
| | | | | | 40 |
| | | | | | 41 |
| | | | | | 42 |
| | BRASS RIVET RD. HD. HOLLOW 1/8 X 3/16 Lg. | | | 2-10140 | 43 |
| | 4-40 1/2 LG. | SCREW, PAN HEAD | | | 44 |
| | 4-40 1/4 LG. | SCREW, PAN HEAD | | | 45 |
| | #4 | WASHER, SPLIT LOCK | | | 46 |
| | 6-32 5/16 LG. | SCREW, PAN HEAD | | | 47 |
| | #6 | WASHER, INT. STAR | | | 48 |

| MODEL | CALICO P/N | ASSY R.O. |
|---|---|---|
| 8303 | 8300-722 | A18 |
| TITLE: MOTHER BOARD ASSEMBLY | SHT 5 OF 5 | |

B

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A19 | 8300-725 | OVERLOAD BOARD ASSY | 16067 | | 1 |
| | -7 | P.C. BOARD | 16067 | 1-55064 | 2 |
| | | | | | 3 |
| | | | | | 4 |
| A19CR1 | IN 914 | DIODE | JEDEC | 3-10118 | 5 |
| A19CR2 | IN 914 | DIODE | JEDEC | 3-10118 | 6 |
| A19CR3 | IN 914 | DIODE | JEDEC | 3-10118 | 7 |
| | | | | | 8 |
| | | | | | 9 |
| A19DS1 | CG03-RCS-N120 | LAMP | 03797 | 2-41119 | 10 |
| | | | | | 11 |
| A19IC1 | MC 724P | IC | 04713 | 3-30111 | 12 |
| A19IC2 | MC 724P | IC | 04713 | 3-30111 | 13 |
| A19IC3 | MC 790P | IC | 04713 | 3-30113 | 14 |
| | | | | | 15 |
| A19Q1 | 2N3566 | TRANSISTOR | 07263 | 3-30091 | 16 |
| A19Q2 | 2N3440 | TRANSISTOR | 95303 | 3-30090 | 17 |
| | | | | | 18 |
| A19R1 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 19 |
| A19R2 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 20 |
| A19R3 | RC07GF153J | RESISTOR 15K 1/4W 5% | JEDEC | 5-10080 | 21 |
| A19R4 | RC07GF104J | RESISTOR 100K 1/4W 5% | JEDEC | 5-10100 | 22 |
| A19R5 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 23 |
| A19R6 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 24 |
| A19R7 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 25 |
| A19R8 | RC07GF474J | RESISTOR 470K 1/4W 5% | JEDEC | 5-10115 | 26 |
| A19R9 | RC07GF104J | RESISTOR 100K 1/4W 5% | JEDEC | 5-10100 | 27 |
| | | | | | 28 |
| | | | | | 29 |
| A19XDS1 | Q-082-4P | SOCKET--LAMP | 03797 | 2-41120 | 30 |
| | | | | | 31 |
| | 02-007-372-5-200 | ELCO PIN (Upper Tier) | 91662 | 2-40328 | 32 |
| | 02-006-332-5-200 | ELCO PIN (Lower Tier) | 91662 | 2-40329 | 33 |
| | 62-5204-40-12 | ELCO GUIDE SOCKET | 91662 | 2-40315 | 34 |
| | | | | | 35 |
| | 24GA | BUSS WIRE | | | 36 |

| MODEL | CALICO P N | ASSY R.O. |
|---|---|---|
| 8300 | 8300-725 | |
| TITLE OVERLOAD BOARD ASSEMBLY | SHT 4 OF 4 | A19 |

APPENDIX A

The following code numbers are from the Federal Supply Code for Manufacturers Cataloging Handbook H4-1 and its latest supplement. Alphabetical codes have been arbitrarily assigned to suppliers not appearing in the H4 Handbook.

| | | |
|---|---|---|
| 0000A | ElectriCord | Westfield, Pa. |
| 0000B | Tech. Prod. Sales | Sorrento Valley, Ca. |
| 0000C | Jackson Bros. | Waddon, Surrey, England |
| 0000D | Chicago Std. Transformer Co. | Chicago, Ill. |
| 0000E | Use Code #08289 | |
| 0000F | Colvern | Santa Monica, Ca. |
| 0000G | Use Code #30983 | |
| 0000H | Mial Of Italy c/o Q. C. Components | Los Angeles, Ca. |
| 00001 | Monsanto, Electronic Special Products | Cupertino, Ca. |
| 0000J | Silicon General | Los Angeles, Ca. |
| 0000K | Elma | Schweiz, Germany |
| 0000L | Intersil | Cupertino, Ca. |
| 0000M | Precision Dynamics Corp. | Burbank, Ca. |
| 00141 | Pic Design Corp. | E. Rockaway, N. Y. |
| 00544 | Metal-Cal Div, Avery Prod. Corp. | Inglewood, Ca. |
| 00656 | Aerovox Corporation | New Bedford, Mass. |
| 00779 | AMP, Inc. | Harrisburg, Pa. |
| 00853 | Sangamo Electric Company | Pickens, S. C. |
| 00866 | Goe Eng. Co., Inc. | City of Industry, Ca. |
| 01121 | Allen-Bradley Company | Milwaukee, Wis. |
| 01255 | Litton Industries, Inc. | Beverly Hills, Ca. |
| 01281 | T R W Semiconductors, Inc. | Lawndale, Ca. |
| 01295 | Texas Instruments, Inc. | Dallas, Tex. |
| 02111 | Spectrol Electronics | City of Industry, Ca. |
| 02114 | Ferroxcube Corp. | Saugerties, N. Y. |
| 02335 | Fairchild Controls Corp. | Hicksville, LI, N. Y. |
| 02660 | Amphenol Corporation | Broadview, Ill. |
| 02799 | Use Code #72136 | |
| 03507 | General Electric Company | Syracuse, N. Y. |
| 03508 | General Electric Company | Syracuse, N. Y. |
| 03516 | General Electric Company | Somersworth, N. H. |
| 03797 | Eldema Corporation | Compton, Ca. |
| 03888 | Pyrofilm Resistor Co., Inc. | Cedar Knolls, N. J. |
| 03911 | Clairex Corporation | New York, N. Y. |
| 04009 | Arrow-Hart and Hegeman Elec. Co. | Hartford, Ct. |
| 04062 | Use Code #72136 | |
| 04713 | Motorola Semiconductor Prod., Inc. | Phoenix, Ariz. |
| 04963 | 3-M | St. Paul, Minn. |
| 05276 | Pomona Electronics Co., Inc. | Pomona, Ca. |
| 05397 | Kemet, Union Carbide Corp. | Cleveland, Ohio |
| 05820 | Wakefield Engineering, Inc. | Wakefield, Mass. |
| 06184 | Conelco Components | San Bernadino, Ca. |
| 06223 | Kooltronic Fan Company | Princeton, N. J. |
| 06229 | Electrovert, Incorporated | Mt. Vernon, N. Y. |
| 06514 | Stantron, Wyco Metal Products | N. Hollywood, Ca. |
| 06540 | Amathom Elect. Hardward | New Rochelle, N. Y. |
| 06682 | Magnetic Shield Div. | Chicago, Ill. |
| 07088 | Kelvin Electric Company | Van Nuys, Ca. |
| 07256 | Silicon Transistor Corp. | Garden City, N. Y. |
| 07263 | Fairchild Camera and Instr. Corp. | Mt. View, Ca. |
| 07387 | Birtcher Corporation | Los Angeles, Ca. |
| 07556 | Unitrack, Calabro Plastics | Upper Darby, Pa. |
| 07716 | I R C, Incorporated | Burrington, Iowa |
| 07910 | Continental Devices | Hawthorne, Ca. |
| 08065 | Accurate Rubber and Plastics Co. | San Diego, Ca. |
| 08201 | Spectra Strip | Garden Grove, Ca. |
| 08289 | Blinn-Delbert Co., Inc. | Pomona, Ca. |
| 08718 | Use Code #71468 | |
| 08730 | Vemaline Products Co. | Franklin Lakes, N. J. |
| 09026 | Babcock Electronics Corp. | Costa Mesa, Ca. |
| 09145 | Atohm, Technical Industries, Inc. | Burbank, Ca. |
| 09353 | C and K Components, Inc. | Newton, Mass. |
| 11432 | Diamond Metal Sales | Gardena, Ca. |
| 11815 | Cherry Rivet Div., Townsend Co. | Santa Ana, Ca. |
| 12020 | Ovenaire, Incorporated | Charlottesville, Va. |
| 12143 | Bendix Corporation | Santa Ana, Ca. |
| 12405 | Hysol Corporation | El Monte, Ca. |
| 12406 | Elpac, Incorporated | Fullerton, Ca. |
| 12463 | Omtronics Mfg., Incorporated | Omaha, Neb. |
| 12697 | Clarostat Mfg. Co., Incorporated | Dover, N. H. |
| 13103 | Thermalloy Company | Dallas, Tex. |
| 13454 | Texas Crystals | River Grove, Ill. |
| 14099 | Semtech Corporation | Newbury Park, Ca. |
| 14655 | Cornell-Dubilier Elect. Corp. | Newark, N. J. |
| 14726 | Hollingsworth Co. | Phoenixville, Pa. |
| 14752 | Electro Cube, Incorporated | San Gabriel, Ca. |
| 15112 | Electra Scientific Corporation | Fullerton, Ca. |
| 15801 | Fenwall Electronics | Framingham, Mass. |
| 15818 | Amelco, Teledyne, Incorporated | Mt. View, Ca. |
| 15909 | Use Code #17870 | |
| 15912 | Digital Sensors, Incorporated | Los Angeles, Ca. |
| 16067 | California Instruments Company | San Diego, Ca. |
| 16758 | Delco Radio Div., General Motors | Kokomo, Ind. |
| 16902 | Simpson Instruments, Inc. | Escondido, Ca. |
| 17745 | Angstrohm Precision, Inc. | Van Nuys, Ca. |
| 17838 | Mektron, California General, Inc. | Chula Vista, Ca. |
| 17870 | Daven Div., Thomas A. Edison | Manchester, N. H. |
| 18077 | Umpco | City of Industry, Ca. |
| 18121 | Wilshire Foam Products, Inc. | Gardena, Ca. |
| 18178 | Vactec Inc. | Maryland Heights, Mo. |
| 18324 | Signatics | Sunnyvale, Ca. |
| 18612 | Vishay Instruments Inc. | Malvern, Pa. |
| 18677 | Scambe Mfg. Co. | Monterey Park, Ca. |
| 18702 | Ducommun Metals and Supply Co. | Los Angeles, Ca. |
| 18722 | R C A | Mountaintop, Pa. |
| 19080 | The Robinson Company | Hawthorne, Ca. |
| 19701 | Potter Company | Sun Valley, Ca. |
| 20857 | South Bay Cable Corp. | Gardena, Ca. |
| 21604 | Buckeye Stamping Company | Columbus, Ohio |
| 22599 | Elastic Stop Nut Corporation | Van Nuys, Ca. |
| 23039 | Deccofelt Products Company | Glendora, Ca. |
| 23050 | Product Components Corp. | Hastings-on-Hudson, N. Y. |
| 23783 | British Radio Electric Ltd. | Washington, D. C. |
| 23936 | Pamotor, Incorporated | San Francisco, Ca. |
| 24796 | Parelco Inc. | Paramount, Ca. |
| 24931 | Specialty Connector Co., Inc. | Indianapolis, Ind. |
| 25784 | Victoreen Instrument Co., Inc. | Oak Lawn, Ill. |
| 25700 | Daburn Electronics and Cable Corp. | New York, N. Y. |
| 26528 | Lamcor, Incorporated | Anaheim, Ca. |
| 26533 | Zero Manufacturing Company | Burbank, Ca. |
| 27014 | National Semi-Conductor Corp. | Santa Clara, Ca. |
| 27191 | Cutler-Hammer, Inc. | Milwaukee, Wisc. |
| 27556 | IMB Electronic Products | Santa Fe Springs, Ca. |
| 27683 | Varo, Incorporated | St. Garland, Tex. |
| 28480 | Hewlett-Packard Co. | Palo Alto, Ca. |
| 28520 | Heyman Mfg. Company (Heyco) | Kenilworth, N. J. |
| 30086 | I-T-E Circuit Breaker Co. | Philadelphia, Pa. |
| 30817 | Instrument Specialties Co. | Little Falls, N. J. |
| 30983 | Electra/Midland | San Diego, Ca. |
| 42190 | Muter Company | Chicago, Ill. |
| 44155 | Ohmite Manufacturing Company | Skokie, Ill. |
| 45722 | Parker-Kalon | Clifton, N. J. |
| 46384 | Penn. Eng. and Mfg. Corp. | Doylestown, Pa. |
| 56289 | Sprague Electric Company | North Adams, Mass. |
| 58474 | Superior Electric Company | Bristol, Ct. |
| 59730 | Thomas and Betts Company | Elizabeth, N. J. |
| 60741 | Triplett Electrical Instrument Co. | Bluffton, Ohio |
| 63743 | Ward Leonard Electric Co. | Mt. Vernon, N. Y. |
| 70903 | Belden Manufacturing Co. | Chicago, Ill. |
| 71002 | Birnbach Radio Company, Inc. | New York, N. Y. |
| 71279 | Cambridge Thermionic Corp. | Cambridge, Mass. |
| 71400 | Bussmann Mfg. Div., McGraw-Edison Co. | St. Louis, Mo. |
| 71450 | CTS Corporation | Elkhart, Ind. |
| 71468 | ITT Cannon Electric, Inc. | Los Angeles, Ca. |
| 71590 | Centralab Div., Globe-Union, Inc. | Milwaukee, Wis. |
| 71744 | Chicago Miniature Lampworks | Chicago, Ill. |
| 71785 | Cinch Manufacturing Company | Chicago, Ill. |
| 72136 | Elmenco (Electro Motive) | Willimantic, Ct. |
| 72259 | Nytronics, Incorporated | Berkeley Heights, N. J. |
| 72619 | Dialight Corporation | Brooklyn, N. Y. |
| 72982 | Erie Technological Products, Inc. | Erie, Pa. |
| 73138 | Beckman Instruments, Inc. | Fullerton, Ca. |
| 73559 | Carling Electric, Inc. | West Hartford, Ct. |
| 73734 | Federal Screw Products, Inc. | Chicago, Ill. |
| 73899 | J F D Electroncis Company | Brooklyn, N. Y. |
| 73949 | Guardian Electric Mfg. Co. | Chicago, Ill. |
| 73957 | Groov-Pin Corporation | Ridgefield, N. J. |
| 74193 | Heinemann Electric Company | Trenton, N. J. |
| 74276 | Signalite, Incorporated | Neptune, N. J. |
| 74542 | Hoyt Electrical Instrument Works | Penacook, N. H. |
| 74545 | Harvey Hubbel, Inc. | Bridgeport, Ct. |
| 74970 | E. F. Johnson Company | Waseca, Minn. |
| 75382 | Kulka Electric Corporation | Mt. Vernon, N. Y. |
| 75915 | Littelfuse, Incorporated | Des Plaines, Ill. |
| 75987 | Use Code #95987 | |
| 76055 | Mallory Controls | Frankfort, Ind. |
| 76348 | Miller Products Company | New York, N. Y. |
| 76493 | J. W. Miller Company | Los Angeles, Ca. |
| 76854 | Oak Manufacturing Company | Crystal Lake, Ill. |
| 77342 | Potter and Brumfield Div., Amer. Machine and Foundry Company | E. Princeton, Ind. |
| 78189 | Shakeproof Div., Illoms Tool Works | Chicago, Ill. |
| 78299 | Struthers-Dunn, Incorporated | Pitman, N. J. |
| 78488 | Stackpole Carbon Company | St. Marys, Pa. |
| 78526 | Stanwyck Winding Company, Inc. | Newburgh, N. Y. |
| 78553 | Tinnerman Products, Inc. | Cleveland, Ohio |
| 78947 | Ucinite Company | Newtonville, Mass. |
| 79136 | Johns-Manville Products Corp. | Chicago, Ill. |
| 79727 | Continental-Wirt Electronics Corp. | Phila., Pa. |
| 79963 | Zierick Mfg. Corporation | New Rochelle, N. Y. |
| 80112 | G. C. Electronics Company | Los Angeles, Ca. |
| 80223 | United Transformer Co. | New York, N. Y. |
| 80294 | Bourns, Incorporated | Riverside, Ca. |
| 80368 | Sylvania Electric Products, Inc. | New York, N. Y. |
| 81073 | Grayhill, Incorporated | La Grange, Ill. |
| 81095 | Triad Transformer Corp. | Venice, Ca. |
| 81312 | Winchester Electronics | Oakville, Ct. |
| 81349 | Military Spec., Standardization Division, Directorate of Logistic Services DSA | |
| 82389 | Switchcraft, Incorporated | Chicago, Ill. |
| 82877 | Rotron Manufacturing Co., Inc. | Woodstock, N. Y. |
| 83058 | Car Fastener Company | Cambridge, Mass. |
| 83324 | Rosan, Incorporated | Newport Beach, Ca. |
| 83330 | Herman H. Smith, Inc. | Brooklyn, N. Y. |
| 83594 | Burroughs Corporation | Plainfield, N. J. |
| 83701 | Electronic Devices, Incorporated | Yonkers, N. Y. |
| 84171 | Arco Electronics, Inc. | Great Neck, N. Y. |
| 86684 | R C A | Harrison, N. J. |
| 87034 | Marco-Oak Industries | Anaheim, Ca. |
| 88020 | Use Code #27191 | |
| 88245 | Useco Div., Litton Industries | Van Nuys, Ca. |
| 90201 | Mallory Capacitor Company | Indianapolis, Ind. |
| 91637 | Dale Electronics, Inc. | Columbus, Neb. |
| 91662 | Elco Corporation | Willow Grove, Pa. |
| 91812 | Janco Corporation | Burbank, Ca. |
| 91833 | Keystone Electronics Corp. | New York, N. Y. |
| 91929 | Micro Switch Div., Honeywell, Inc. | Freeport, Ill. |
| 92194 | Alpha Wire Corporation | Elizabeth, N. J. |
| 92219 | Waldom Electronics, Inc. | Chicago, Ill. |
| 93332 | Sylvania Electric Products, Inc. | Woburn, Mass. |
| 94222 | Southco, Incorporated | Lester, Pa. |
| 95146 | Alco Electronics Products | Lawrence, Mass. |
| 95263 | R C A | Cincinnati, Ohio |
| 95418 | Use Code #95146 | |
| 95987 | Weckesser Company, Inc. | Chicago, Ill. |
| 96682 | Genisco, Incorporated | Compton, Ca. |
| 97525 | Electronic Engineering Co. | Santa Ana, Ca. |
| 97954 | U. S. Components, Incorporated | Bronx, N. Y. |
| 98159 | Rubber Teck, Incorporated | Gardena, Ca. |
| 98278 | Microdot, Incorporated (Lerco) | S. Pasadena, Ca. |
| 98378 | ERC | Burbank, Ca. |
| 99392 | STM Corporation | Oakland, Ca. |
| 99515 | Marshall Industries | Monrovia, Ca. |
| 99517 | Vacco Industries | El Monte, Ca. |
| 99800 | Delevan Electronics Corporation | Aurora, N. Y. |
| 99942 | Permacel Div., Johnson and Johnson | New Brunswick, N. J. |

APPENDIX B

# DETAILED INSTRUCTIONS FOR

PRINT-OUT

OPTION "P"

SUB-ASSY A15

CALICO P/N 8300-710

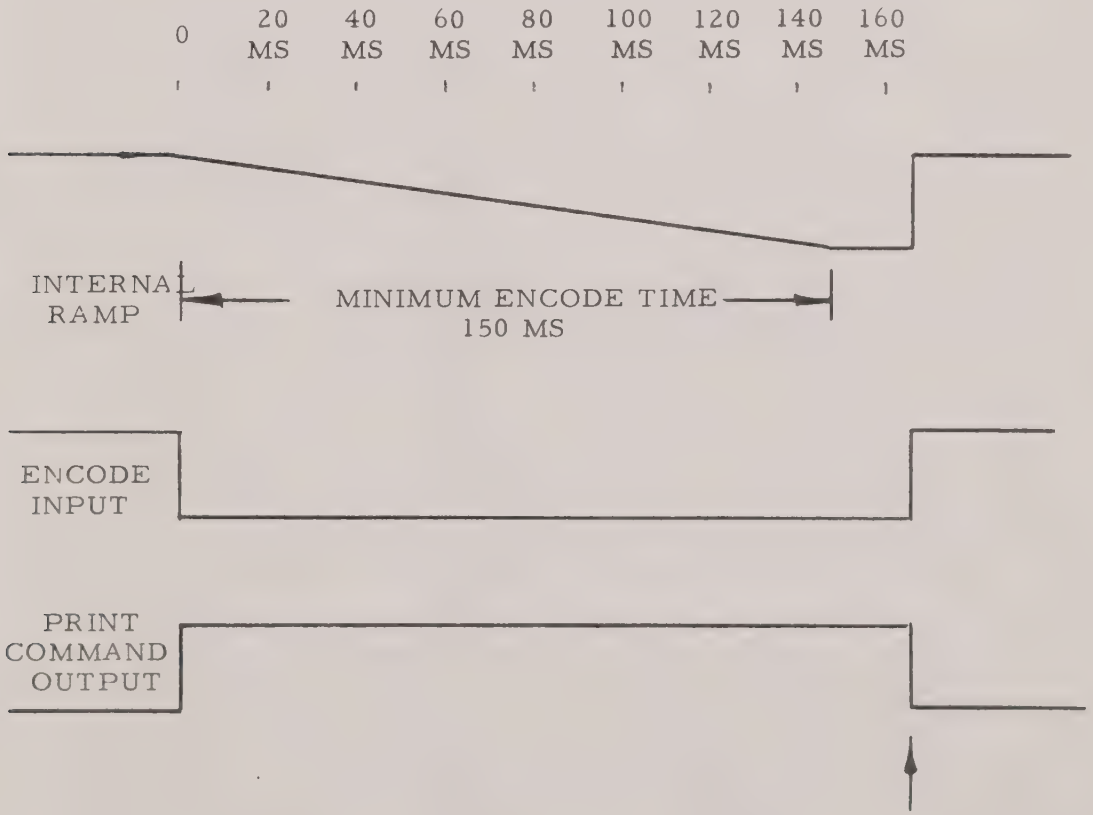
## PRINT OUTPUT

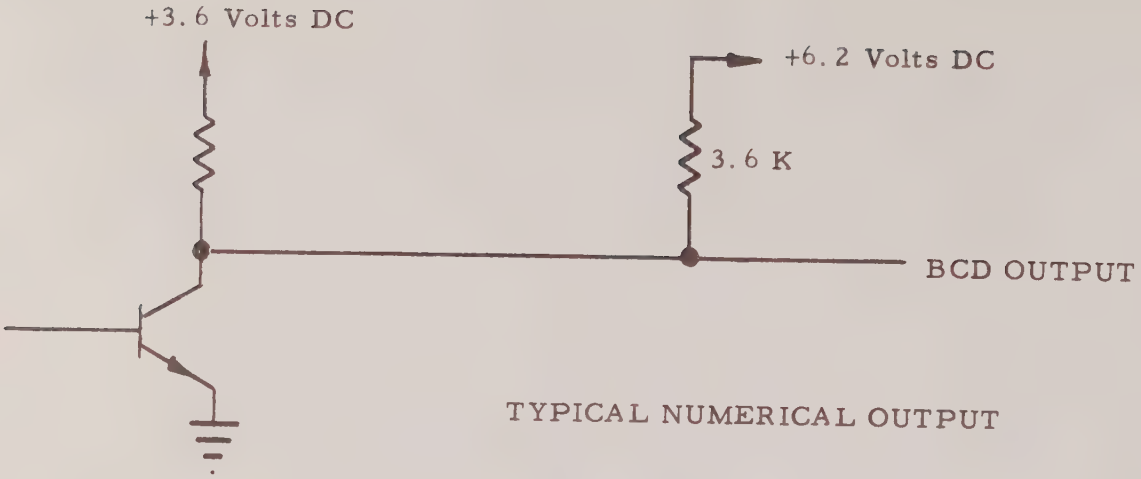
The 8300-710 print-out board contains the signal buffering and delay circuits required for most small system requirements. A schematic diagram is contained on drawing E8300-080.

All outputs that are required to operate a conventional printer are available at the 50 pin output connector J1 located on the rear panel. All encoding and delay inputs and outputs are available at the 14 pin output connector J2 located on the rear panel.

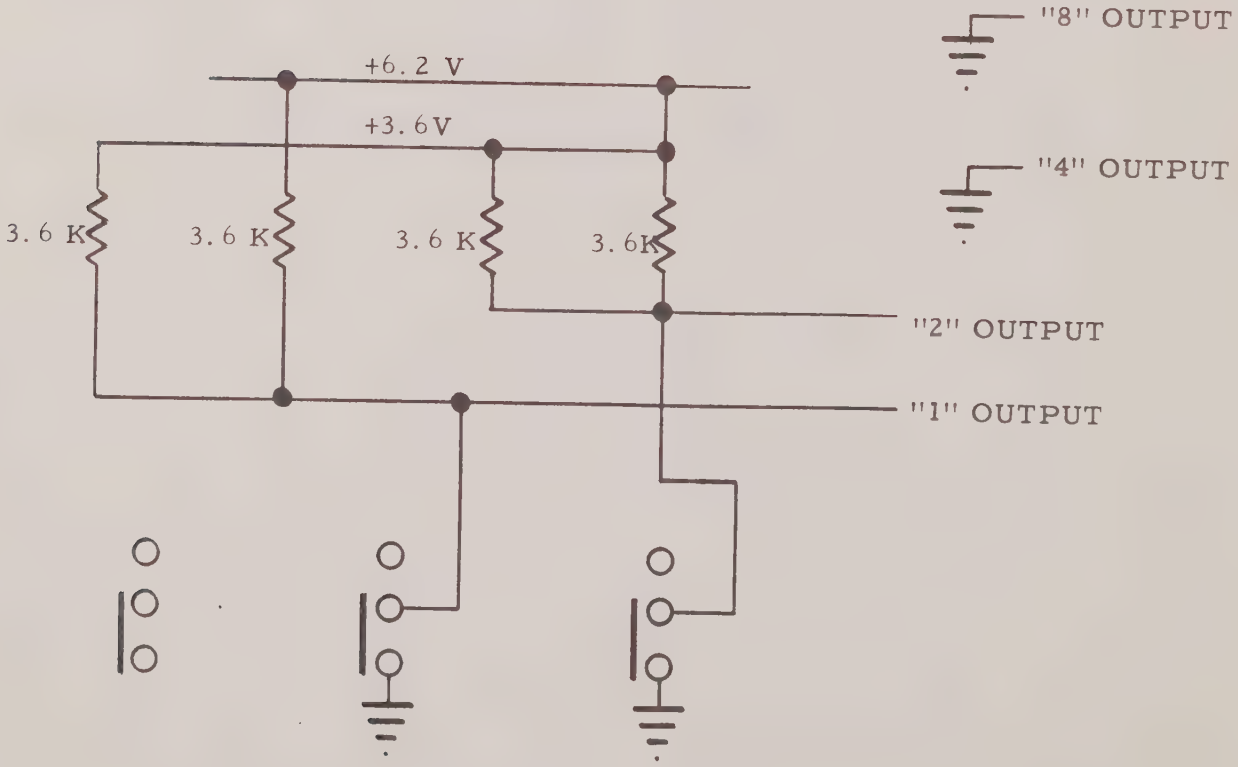
## PRINT COMMAND

The print command output, J1 Pin 48 and J2 Pin 2, is used to start the printing sequence in the printing device. The negative going print command occurs at the instant the new data has been transferred into the output storage register. See timing drawing Figure 1.






TYPICAL NUMERICAL OUTPUT




RANGE or FUNCTION SWITCH

SIMPLIFIED SCHEMATIC

## ENCODE INPUT

The encode cycle must have two time periods, an encode period and a restore period. The encode period is formed by driving J2 Pin 8 to ground. The restore period is formed by driving J2 Pin 8 positive. The encode period must be a minimum of 150 MS long. The restore period must be a minimum of 5 MS long.

| | | |
|---|---|---|
| Level limits: | Encode | 0 volts ±.4 volts |
| | Restore | +2.7 volts ±.9 volts |

The data gathered in the counters during the encode cycle is transferred into the storage register at the beginning of the restore cycle. It is, therefore, possible to gather and hold two sets of data in an 8303 simultaneously; one in the storage register being displayed and the other in the decode counters awaiting display.

## DELAY CIRCUITS

The 8300-710 board contains two delay circuits; one fixed delay, the other a variable delay.

The fixed delay may be activated by pulsing J2 Pin 5 positive. As J2 Pin 5 goes positive, J2 Pin 12 turns on to ground. After approximately 250 MS, J2 Pin 12 returns to the positive state.

The input to the variable delay is brought out at J2 Pin 4. To start the delay J2 Pin 4 should be driven to +3.6 volts and J2 Pin 9 must be pulsed positive. This delay can be set to hold off for several seconds before resetting, or set to hold off for only 200 MS before resetting. This adjustment is A15R48.

# 8303 PRINT OUTPUT CODE SEQUENCE

The 8303 output code is "1-2-4-8" positive "1" state. The "1" state is +5 VDC ±10% at a source impedance of 1.8KΩ. The "0" state is 0 VDC ±.4 VDC at a maximum sink current of 5 MA DC.

| | NUMERICAL REPRESENTATION | BCD OUTPUT |
|---|---|---|
| | | 1-2-4-8 |
| TYPICAL DECADE | 0 | 0 0 0 0 |
| | 1 | 1 0 0 0 |
| | 2 | 0 1 0 0 |
| | 3 | 1 1 0 0 |
| | 4 | 0 0 1 0 |
| | 5 | 1 0 1 0 |
| | 6 | 0 1 1 0 |
| | 7 | 1 1 1 0 |
| | 8 | 0 0 0 1 |
| | 9 | 1 0 0 1 |
| RANGE SWITCH POSITION | | |
| 1 | 0 | 0 0 0 0 |
| 10 | 1 | 1 0 0 0 |
| 100 | 2 | 0 1 0 0 |
| FUNCTION SWITCH POSITION | | |
| Ω | 0 | 0 0 0 0 |
| KΩ | 1 | 1 0 0 0 |
| MΩ | 2 | 0 1 0 0 |

REAR PANEL CONNECTOR "J1"
AMPHENOL BLUE RIBBON 50 PIN

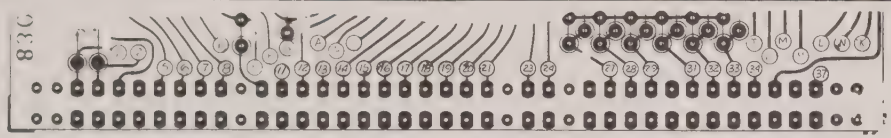
| PIN NUMBER | | OUTPUT |
|---|---|---|
| 1 | "1" BIT | UNITS DECADE |
| 2 | "2" BIT | |
| 26 | "4" BIT | |
| 27 | "8" BIT | |
| 3 | "1" BIT | TENS DECADE |
| 4 | "2" BIT | |
| 28 | "4" BIT | |
| 29 | "8" BIT | |
| 5 | "1" BIT | HUNDREDS DECADE |
| 6 | "2" BIT | |
| 30 | "4" BIT | |
| 31 | "8" BIT | |
| 7 | "1" BIT | THOUSANDS DECADE |
| 8 | "2" BIT | |
| 32 | "4" BIT | |
| 33 | "8" BIT | |
| 9 | "1" BIT * | TEN THOUSANDS DECADE |
| 10 | "2" BIT | |
| 34 | "4" BIT | |
| 35 | "8" BIT | |
| 11 | "1" BIT | RANGE SWITCH |
| 12 | "2" BIT | |
| 36 | "4" BIT | |
| 37 | "8" BIT | |
| 13 | "1" BIT | FUNCTION SWITCH |
| 14 | "2" BIT | |
| 38 | "4" BIT | |
| 39 | "8" BIT | |

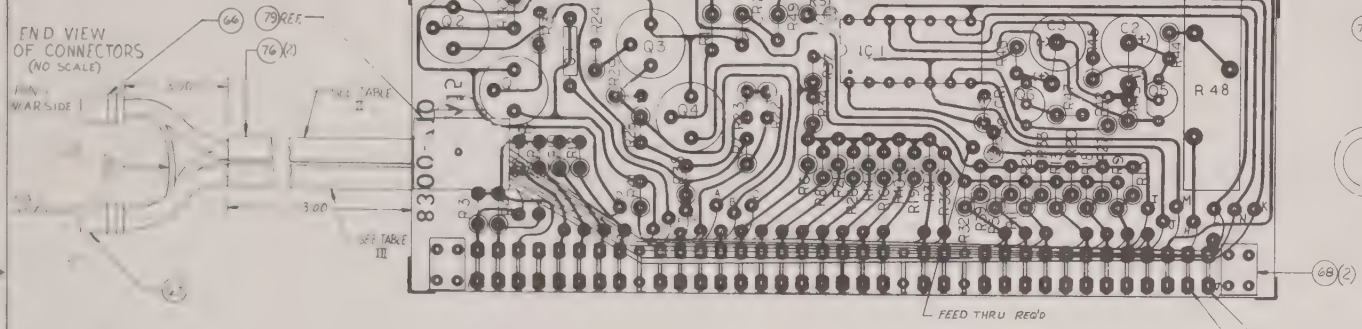
| | |
|---|---|
| 25 | POSITIVE LOGIC REFERENCE |
| 48 | PRINT COMMAND (DIRECT COUPLED) |
| 46 | PRINT COMMAND (CAPACITIVE COUPLED) |
| 24 | GROUND |
| 50 | GROUND |

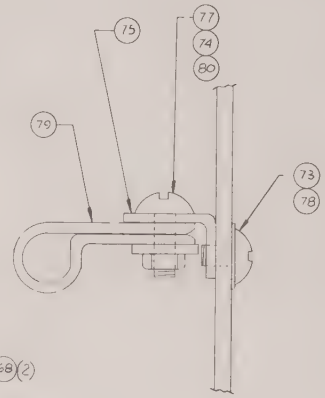
* Ten thousands "1" bit may be used as a range exceeded indication to void data above 09999.

REAR PANEL CONNECTOR "J2"
AMPHENOL BLUE RIBBON 14 PIN

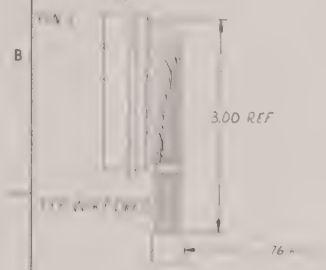
| | |
|---|---|
| 1 | GROUND |
| 2 | PRINT COMMAND (NEGATIVE GOING) |
| 3 | ENCODE DRIVER OUTPUT |
| 4 | VARIABLE DELAY INPUT |
| 5 | FIXED DELAY RESET |
| 6 | FREQUENCY MODE INHIBIT |
| 7 | FIXED DELAY INVERTED OUTPUT |
| 8 | ENCODE INPUT |
| 9 | VARIABLE DELAY RESET |
| 10 | 5 Hz TIME BASE OUTPUT |
| 11 | VARIABLE DELAY INVERTED OUTPUT |
| 12 | FIXED DELAY OUTPUT |
| 13 | +3.6 VOLT POWER SUPPLY |
| 14 | VARIABLE DELAY OUTPUT |




VIEW CABLE CLAMP INST.




A15
-1 ASSEMBLY
VIEW COMPONENT SIDE

TABLE II (3)

| WIRE # | FROM | TO | COLOR | LENGTH |
|---|---|---|---|---|
| 1 | J1-50 | J2-1 | BRN | |
| 2 | J1-48 | J2-2 | RED | |
| 3 | | | ORN | |
| 4 | | | YEL | |
| 5 | A15-I | J2-5 | GRN | |
| 6 | A15-11 | J2-6 | BLU | |
| 7 | | | VIO | |
| 8 | | | GRY | |
| 9 | | | WHT | |
| 10 | | | W/BLU | |
| 11 | A15-L | J2-11 | W/BRN | |
| | | | W/RED | |
| | | | W/GRN | |
| | | | W/YEL | |
| | | | W/GRY | |
| | | | W/BLK | |
| | | | W/VIO | |
| 20 | A15 27 | J1-36 | W/BLK/RED | |
| 21 | A15-G | J1-9 | W/BLK/GRN | |

TABLE III (3)

| WIRE # | FROM | TO | COLOR | LENGTH |
|---|---|---|---|---|
| 22 | A15-F | J1-46 | W/BLK/YEL | |
| 23 | A15-E | J1-48 | W/BLK/RED | |
| 24 | A15-D | J1-10 | W/BRN/BLU | |
| 25 | A15-A | J1-25 | W/BRN/VIO | |
| 26 | A15-B | J1-16 | W/BLK/GRN | |
| 27 | A15-C | J1-15 | W/BRN/ORN | |
| 28 | A15-K | J1-2 | W/BRN/BRN | |
| 29 | A15-J | J1-5 | W/BRN/GRN | |
| 30 | A15-H | J1-4 | W/BRN/BLU | |
| 31 | A15-28 | J1-7 | W/BRN/YEL | |
| 32 | A15 17 | J1-31 | W/BRN/WHT | |
| 33 | | | BRN | |
| 34 | | | RED | |
| 35 | | | ORN | |
| 36 | | | YEL | |
| 37 | | | GRN | |
| 38 | | | BLU | |
| 39 | | | VIO | |
| 40 | | | GRY | |
| 41 | | | WHT | |
| 42 | A15-6 | J1-2 | W/BLK | |
| 43 | A15-5 | J1-1 | W/BRN | |

TABLE I
JUMPER WIRE INST.

| FROM | TO |
|---|---|
| J1-16 | J1-34 |
| | |
| | |
| | |
| J1-29 | J1-40 |
| J1-47 | J1-41 |
| | |
| | |

1. ALL WIRES ARE 24GA
2. WIRES J1-50 TO J2-1 & J1-48 TO J2-2 OR SCHEMATIC SEE DWG. NO. E 8300-080.

NOTE: UNLESS OTHERWISE SPECIFIED

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | AUTH | DESCRIPTION | ZONE | EFF ON | DATE | APPD |

| ITEM NO | REQD PER ASSY | PART NUMBER | PART NAME | MATERIAL SPECIFICATION | CODE IDENT | FINISH | REF DES | ZONE |
|---|---|---|---|---|---|---|---|---|
| -1 | | PL 8300 110 | PARTS LIST | SHEETS 4, 5 & 6 | | | | |

DIMENSIONS IN INCHES
TOLERANCES
XXX = .010
XX = .03
X = .1

BREAK ALL SHARP CORNERS & LOOSE MACH SURFACES

DWG SIZE D

TITLE: PRINT BOARD (A15) ASSEMBLY

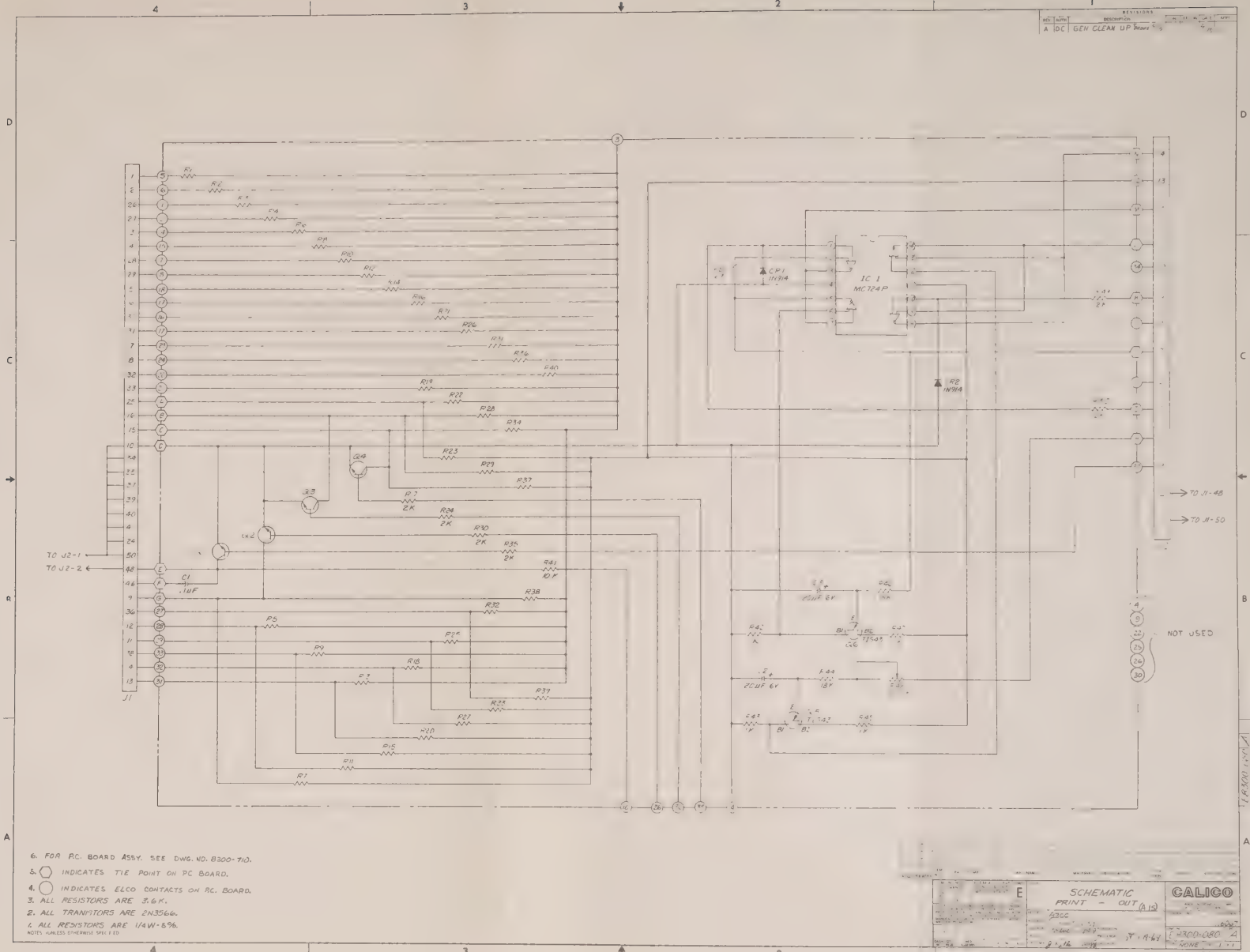
CALICO
CALIFORNIA MICROWAVE, CORP
SAN DIEGO, CALIFORNIA

CONTRACT NO | CODE IDENT 16067

DWG NO. L 8300 110 | REV D

SCALE | SHEET 2 OF 6

D8300-110 D




6. FOR PC. BOARD ASSY. SEE DWG. NO. 8300-710.
5. ⬡ INDICATES TIE POINT ON PC BOARD.
4. ◯ INDICATES ELCO CONTACTS ON PC. BOARD.
3. ALL RESISTORS ARE 3.6K.
2. ALL TRANSISTORS ARE 2N3566.
1. ALL RESISTORS ARE 1/4W-5%.

NOTES: UNLESS OTHERWISE SPECIFIED

| | | |
|---|---|---|
| E | SCHEMATIC PRINT - OUT (A12) | CALICO |
| | 8300-080 | A |
| | NONE | |

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A15 | 8300-710 | PRINT BOARD | 16067 | | 1 |
| | -7 | P.C. BOARD | 16067 | 1-55044 | 2 |
| | | | | | 3 |
| | | | | | 4 |
| A15C1 | CK-104 | CAPACITOR .1μf | 71590 | 6-10129 | 5 |
| A15C2 | TE-1090 | CAPACITOR 20μf 6V | 56289 | 6-10345 | 6 |
| A15C3 | TE-1090 | CAPACITOR 20μf 6V | 56289 | 6-10345 | 7 |
| | | | | | 8 |
| A15CR1 | IN914 | DIODE | JEDEC | 3-10118 | 9 |
| A15CR2 | IN914 | DIODE | JEDEC | 3-10118 | 10 |
| | | | | | 11 |
| A15IC1 | MC 724P | I.C. | 04713 | 3-30111 | 12 |
| | | | | | 13 |
| A15R1 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 14 |
| A15R2 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 15 |
| A15R3 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 16 |
| A15R4 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 17 |
| A15R5 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 18 |
| A15R6 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 19 |
| A15R7 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 20 |
| A15R8 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 21 |
| A15R9 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 22 |
| A15R10 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 23 |
| A15R11 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 24 |
| A15R12 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 25 |
| A15R13 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 26 |
| A15R14 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 27 |
| A15R15 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 28 |
| A15R16 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 29 |
| A15R17 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 30 |
| A15R18 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 31 |
| A15R19 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 32 |
| A15R20 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 33 |
| A15R21 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 34 |
| A15R22 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 35 |
| A15R23 | RC07GF326J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 36 |

MODEL 8300 | CALICO P N 8300-710 | ASSY R.O. A15

TITLE PRINT BOARD | SHT 4 OF 6

CALICO — CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA — CODE IDENT 16067

# PARTS LIST

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| A15R24 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 37 |
| A15R25 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 38 |
| A15R26 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 39 |
| A15R27 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 40 |
| A15R28 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 41 |
| A15R29 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 42 |
| A15R30 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 43 |
| A15R31 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 44 |
| A15R32 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 45 |
| A15R33 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 46 |
| A15R34 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 47 |
| A15R35 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 48 |
| A15R36 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 49 |
| A15R37 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 50 |
| A15R38 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 51 |
| A15R39 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 52 |
| A15R40 | RC07GF362J | RESISTOR 3.6K 1/4W 5% | JEDEC | 5-10065 | 53 |
| A15R41 | RC07GF103J | RESISTOR 10K 1/4W 5% | JEDEC | 5-10076 | 54 |
| A15R42 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 55 |
| A15R43 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 56 |
| A15R44 | RC07GF183J | RESISTOR 18K 1/4W 5% | JEDEC | 5-10082 | 57 |
| A15R45 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 58 |
| A15R46 | RC07GF183J | RESISTOR 18K 1/4W 5% | JEDEC | 5-10082 | 59 |
| A15R47 | RC07GF102J | RESISTOR 1K 1/4W 5% | JEDEC | 5-10053 | 60 |
| A15R48 | 8387-504 | POT 500K | 91637 | 5-70094 | 61 |
| A15R49 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 62 |
| A15R50 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 63 |
| A15R51 | RC07GF202J | RESISTOR 2K 1/4W 5% | JEDEC | 5-10059 | 64 |
| | | | | | 65 |
| | 57-40140 | RECEPTACLE | 02660 | 4-10110 | 66 |
| | 57-40500 | RECEPTACLE | 02660 | 4-10024 | 67 |
| | 62-5204-40-12 | GUIDE SOCKET | 91662 | 2-40315 | 68 |
| | 02-019-372-5-200 | ELCO PIN (UPPER TIER) | 91662 | 2-40305 | 69 |
| | 02-018-332-5-200 | ELCO PIN (LOWER TIER) | 91662 | 2-40306 | 70 |
| | 57-30140 | PLUG | 02660 | 4-10021 | 71 |
| | 57-30500 | PLUG | 02660 | 4-10022 | 72 |

MODEL 8300 — CALICO P N 8300-710 — E — ASSY R.O. A15

TITLE PRINT BOARD — SHT 5 OF 6

CALICO | CALIFORNIA INSTRUMENTS CORP. SAN DIEGO, CALIFORNIA | CODE IDENT 16067 | **PARTS LIST**

| REF. DES. | MFG. NUMBER | DESCRIPTION | CODE IDENT | CALICO STOCK NUMBER | ITEM NO. |
|---|---|---|---|---|---|
| | 4-40 x 5/32 LG. | SCREW, PAN HEAD | | | 73 |
| | #4 | WASHER, FLAT | | | 74 |
| | 129515 | BRACKET | 73734 | 1-10167 | 75 |
| | 1/4 ID | NYLON TUBING | | | 76 |
| | 4-40 x 3/8 LG. | SCREW, PAN HEAD | | | 77 |
| | #4 | WASHER, INT. STAR. | | | 78 |
| | 834 | CABLE CLAMP | 83330 | | 79 |
| | 4-40 x 3/16 Hex | HEX NUT | | | 80 |
| | | | | | 81 |
| A15Q1 | 2N3566 | TRANSISTOR | 02335 | 3-30091 | 82 |
| A15Q2 | 2N3566 | TRANSISTOR | 02335 | 3-30091 | 83 |
| A15Q3 | 2N3566 | TRANSISTOR | 02335 | 3-30091 | 84 |
| A15Q4 | 2N3566 | TRANSISTOR | 02335 | 3-30091 | 85 |
| A15Q5 | TIS43 | TRANSISTOR | 01295 | 3-30131 | 86 |
| A15Q6 | TIS43 | TRANSISTOR | 01295 | 3-30131 | 87 |

MODEL 8300 | CALICO P N 8300-710 E | ASSY R.O A15

TITLE PRINT BOARD | SHT 6 OF 6

## ONE YEAR WARRANTY

CALIFORNIA INSTRUMENTS CORPORATION warrants each instrument manufactured by them to be free from defects in material and workmanship for a period of one year from the date of shipment to the original purchaser. Excepted from this warranty are tubes, fuses, and batteries which carry the warranty of their original manufacturer where applicable. CALIFORNIA INSTRUMENTS CORPORATION will service, replace, or adjust any defective part or parts, free of charge, when the instrument is returned to the Company freight prepaid, and when examination reveals that the fault has not occurred because of misuse or abnormal conditions of operation. Equipment repaired beyond the effective date of warranty or when abnormal usage has occurred will be charged at applicable rates. CALICO will submit an estimate for such charges before commencing repair if so requested.

## PROCEDURE FOR SERVICE

If a fault develops, notify CALICO or its local representative, giving full details of the difficulty, and including the model number and serial number. On receipt of this information, service data or shipping instructions will be furnished. If shipment is indicated, forward the instrument, freight prepaid, to the authorized repair station indicated in the instruction. If requested, an estimate of the charges will be made before the work begins, provided the instrument is not covered by the warranty.

## DAMAGE IN TRANSIT

The instrument should be tested as soon as it is received. If it fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent, and this report should be forwarded to us. CALICO will advise the disposition to be made of the equipment and arrange for repair or replacement. Please include model number and serial number when referring to the instrument.

MP MASTER
MA28068